TECHNICAL MANUAL

BC-1G 1000/250 WATT

BROADCAST TRANSMITTER

994 6245 001/003

HARRIS CORPORATION

Broadcast Products Division

T.M. No. 888-0800-002

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Carefully unpack the equipment and preform a visual inspection to determine that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that all received equipment is not damaged. Locate and retain all PACKING CHECK LIST's. Use the PACKING CHECK LIST to help locate and identify any components or assemblies which are removed for shipping and must be reinstalled. Also remove any shipping supports, straps, and packing materials prior to initial turn on.

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Replacement parts are available 24 hours a day, seven days a week from the HARRIS Service Parts Department. Telephone 217/222-8200 to contact the service parts department or address correspondence to Service Parts Department, HARRIS CORPORATION, Broadcast Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. The HARRIS factory may also be contacted through a FAX facility (217/222-7041) or a TELEX service (650/372-2976).

NOTE

The # symbol used in the parts list means used with (e.g. #C001 = used with C001).

WARNING

THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS. PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY REGULATIONS.

This manual is intended as a general guide for trained and qualified personnel who are aware of the dangers inherent in handling potentially hazardous electrical/electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must be performed only by qualified personnel exercising due care. HARRIS CORPORATION shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

During installation and operation of this equipment, local building codes and fire protection standards must be observed. The following National Fire Protection Association (NFPA) standards are recommended as references:

- Automatic Fire Detectors, No. 72E
- Installation, Maintenance, and Use of Portable Fire Extinguishers, No. 10
- Halogenated Fire Extinguishing Agent Systems, No. 12A

WARNING

ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS. ALWAYS USE GROUNDING STICKS AND SHORT OUT HIGH VOLTAGE POINTS BEFORE SERVICING. NEVER MAKE INTERNAL ADJUSTMENTS, PERFORM MAINTENANCE OR SERVICE WHEN ALONE OR WHEN FATIGUED.

Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields. Keep away from live circuits, know your equipment and don't take chances.

WARNING

IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED.

WARNING

IF OIL FILLED OR ELECTROLYTIC CAPACITORS ARE UTILIZED IN YOUR EQUIPMENT, AND IF A LEAK OR BULGE IS APPARENT ON THE CAPACITOR CASE WHEN THE UNIT IS OPENED FOR SERVICE OR MAINTENANCE, ALLOW THE UNIT TO COOL DOWN BEFORE ATTEMPTING TO REMOVE THE DEFECTIVE CAPACITOR. DO NOT ATTEMPT TO SERVICE A DEFECTIVE CAPACITOR WHILE IT IS HOT DUE TO THE POSSIBILITY OF A CASE RUPTURE AND SUBSEQUENT INJURY.

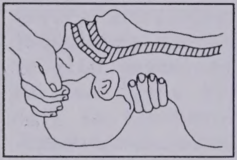
TREATMENT OF ELECTRICAL SHOCK

1. IF VICTIM IS NOT RESPONSIVE FOLLOW THE A-B-CS OF BASIC LIFE SUPPORT.

PLACE VICTIM FLAT ON HIS BACK ON A HARD SURFACE

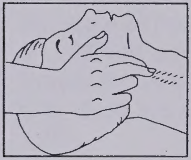
Ⓐ AIRWAY

IF UNCONSCIOUS,
OPEN AIRWAY



LIFT UP NECK
PUSH FOREHEAD BACK
CLEAR OUT MOUTH IF NECESSARY
OBSERVE FOR BREATHING

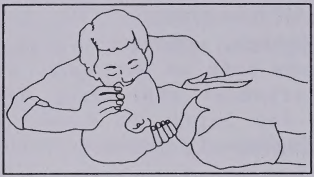
CHECK
CAROTID PULSE



IF PULSE ABSENT,
BEGIN ARTIFICIAL
CIRCULATION

Ⓑ BREATHING

IF NOT BREATHING,
BEGIN ARTIFICIAL BREATHING



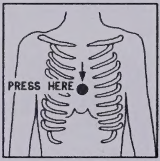
TILT HEAD
PINCH NOSTRILS
MAKE AIRTIGHT SEAL

4 QUICK FULL BREATHS

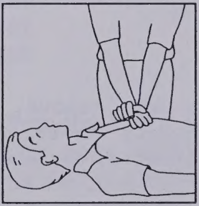
REMEMBER MOUTH TO MOUTH
RESUSCITATION MUST BE
COMMENCED AS SOON AS POSSIBLE

Ⓒ CIRCULATION

DEPRESS STERNUM 1 1/2 TO 2 INCHES



APPROX. RATE OF COMPRESSIONS --80 PER MINUTE	ONE RESCUER 15 COMPRESSIONS 2 QUICK BREATHS
APPROX. RATE OF COMPRESSIONS --60 PER MINUTE	TWO RESCUERS 5 COMPRESSIONS 1 BREATH



NOTE: DO NOT INTERRUPT RHYTHM OF COMPRESSIONS
WHEN SECOND PERSON IS GIVING BREATH

CALL FOR MEDICAL ASSISTANCE AS SOON AS POSSIBLE.

2. IF VICTIM IS RESPONSIVE.

   A. KEEP THEM WARM
   B. KEEP THEM AS QUIET AS POSSIBLE
   C. LOOSEN THEIR CLOTHING
   D. A RECLINING POSITION IS RECOMMENDED

FIRST-AID

Personnel engaged in the installation, operation, maintenance or servicing of this equipment are urged to become familiar with first-aid theory and practices. The following information is not intended to be complete first-aid procedures, it is brief and is only to be used as a reference. It is the duty of all personnel using the equipment to be prepared to give adequate Emergency First Aid and thereby prevent avoidable loss of life.

Treatment of Electrical Burns

1. Extensive burned and broken skin
   a. Cover area with clean sheet or cloth. (Cleanest available cloth article.)
   b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
   c. Treat victim for shock as required.
   d. Arrange transportation to a hospital as quickly as possible.
   e. If arms or legs are affected keep them elevated.

NOTE

> If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot or cold). Allow victim to sip slowly about 4 ounces (a half of glass) over a period of 15 minutes. Discontinue fluid if vomiting occurs. (Do not give alcohol.)

2. Less severe burns - (1st & 2nd degree)
   a. Apply cool (not ice cold) compresses using the cleanest available cloth article.
   b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
   c. Apply clean dry dressing if necessary.
   d. Treat victim for shock as required.
   e. Arrange transportation to a hospital as quickly as possible.
   f. If arms or legs are affected keep them elevated.

REFERENCE: ILLINOIS HEART ASSOCIATION

AMERICAN RED CROSS STANDARD FIRST AID AND PERSONAL SAFETY MANUAL (SECOND EDITION)

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SECTION I

GENERAL DESCRIPTION

1-1. INTRODUCTION

1-2. It is the purpose of this technical manual to thoroughly explain in a clear, concise manner, the workings of the BC-1G BROADCAST TRANSMITTER, as well as installation and operational information. The pictures show clearly all components within the cabinet. These parts are adequately marked for easy reference back to the parts list and to the written text.

1-3. MECHANICAL CONSTRUCTION

1-4. BC-1G TRANSMITTER

1-5. The BC-1G Transmitter is completely self-contained in one attractive steel cabinet measuring 78" high, 37" wide and 29" deep with a full front door, with its "shadow molding" covering practically the complete front. This door is hinged from the left side. It requires 33" of floor space to swing open. Four large meters are located on a panel mounted across the top of the cabinet. Most of the controls are mounted behind and hidden by this door; the exception being the filament start/stop, reset, plate off, low power and high power combination switch and neon indicators. These switches are mounted on the right hand cabinet corner post, protruding through an opening in the door when it is closed.

1-6. The heavy power components are mounted on the base of the cabinet. The low powered audio and radio frequency stages are built on a "panel and shelf" assembly, along with the control circuitry and the bias supply. Mounted on the shelf portion of this assembly is the multi-winding filament transformer used to energize all tube filaments in the silicon powered transmitter. (If tube rectifiers are used, two additional rectifier filament transformers must be used). At the top of this panel assembly are the four sets of filament connectors which secure the PA and modulator 833A tubes. The two tubes to the front of the transmitter, V40 and V41, are the rf amplifiers; the two toward the rear, V42 and V43, are the modulators.

1-7. This complete "panel and shelf" assembly is hinged to the right rear cabinet corner post, and held securely by three captive, slotted-head screws at the front corner post. This feature allows this panel to be loosened, then swung inward on its hinges to provide access to the complete panel without removing the right hand side of the cabinet. This is of great advantage if the transmitter is located in a position necessitating other equipment to be placed directly against the right hand side of the transmitter.

1-8. All tuning controls are available from the front of the transmitter. (Large front cabinet door must, of course, be opened). An interlocked, perforated metal screen is mounted over the front opening of the transmitter, which gives the utmost physical protection to the operating personnel. This screen is easily removable from the cabinet, allowing full access to the inside of the cabinet from the front.

1-9. One exhaust fan is located above the 833A power tubes, in the top of the cabinet, to draw the heated air up and out during operation. Two disposable air filters are located in the power portion of the back cabinet cover, through which cool air is drawn into the transmitter.

1-10. The dummy antenna assembly is mounted on the left cabinet wall, toward the top, as viewed from the front.

1-11. Both the back and right hand side of this transmitter cabinet is removable for servicing, if required.

1-12. M5422 OSCILLATOR UNIT

1-13. This oscillator unit physically is 6-1/2 inches wide including mounting flanges, 6-1/2 inches high, and 6-3/4 inches deep, including connector plug. The unit is mounted by means of its flanged bottom on the aluminum vertical portion of the "panel and shelf". Its controls extend out through a cutout in the front vertical panel. The oscillator shield cover held in place by one thumb screw, can be removed by unfastening and sliding horizontally away from the oscillator chassis. Connections to the M5422 oscillator unit are made by a 8 position female plug, P1, at the rear.

1-14. TRANSMITTER CONTROLS

1-15. All transmitter tuning controls are available from the front of the transmitter. The small vertical panel, which is an integral part of the "panel and shelf" assembly located on the right side of the cabinet, behind the front door, has the following controls:

a. The crystal selector switch, S1, and the two crystal trimmer capacitors, C1 and C2. (The M5422 Crystal Oscillator Unit is mounted directly behind this panel.) Its controls, S1, C1 and C2, protrude through a small aperture in this panel, and thus, are available from the front.)

b. The rf driver tank tuning capacitor, C4.

c. Multimeter switch, S2.

d. Modulator cathode current selector switch, S1.

e. Modulator bias controls, R1 and R2.

1-16. The following controls are located on the right hand corner post section of the cabinet:

a. Filament rheostat, R43.

b. Plate rheostat, R41.

c. Filament On/Off, S41. (Red pushbutton).

d. Reset, S42. (Red pushbutton).

e. Plate stop, S43. (White pushbutton).

f. 250 Watt carrier, S44. (Amber pushbutton).

g. 1000 Watt carrier, S45. (White pushbutton).

h. Local/Remote toggle switch, S40.

1-17. A complement of four large meters are mounted on a panel at the top of the cabinet. From left to right, they are:

a. Multimeter, M40

b. Modulator cathode current, M43.

c. PA plate current, M42.

d. PA plate volts, M41.

1-18. The line meter, M44, is mounted on the power amplifier panel, and is visible when the front cabinet door is open. Also on this PA panel we find the power amplifier tuning control, L40, the power amplifier load control, L42, and the neutralizing adjustment, C40. This latter facility is a screwdriver adjustment made through a small opening in the panel. It is, of course, a seldom manipulated control.

1-19. INCIDENTAL INFORMATION

1-20. TUBE HANDLING

1-21. The BC-1G Transmitter uses 833A power tubes in the power amplifier and modulator stages. These are of the single wire or thread filament type, as compared to other tubes which may have the filament (heater) contained in a tube, which is commonly called the cathode assembly. Tubes having single wire, or thread type filaments, supported by springs (such as the 833A) require more than normal care in handling. These filament wires are easily broken by sudden, heavy vibration. At all times handle the tubes with care, until they are safely inserted in the tube sockets of the transmitter.

1-22. At this point, more care must be exercised in this type of power tube, as the filament prongs are also the means by which the tubes are secured. Make sure the filament connections have some "give" so that no undue strain is placed on the glass-to-metal filament prongs. As the glass envelope will expand a bit during operation, the two securing filament connectors must be free to move themselves.

1-23. Take care when making the grid and plate connections to the tube, do not put any undue strain on these connections during tube installation. Of course, the connections to the grid and plate should be flexible to allow for expansion of the tube. For shipping or storing it is advisable to use the packing material and carton that the tube was shipped in from the tube manufacturer. Following these reasonable precautions, there should be no trouble in handling these tubes.

1-24. TRANSMITTER BUILDING TEMPERATURES

1-25. If this transmitter is to be unattended (operated by remote control) care should be taken that winter temperatures inside the transmitter building do not go below 50°F. Mercury vapor tubes (if used) will arc back at low temperatures, often causing severe damage either to themselves or to other expensive components. Protective relays and fan motors may also become sluggish under extremely cold conditions. Failure to provide adequate winter minimum building temperatures will void the guarantee.

1-26. GROUNDING

1-27. The grounding of the transmitter installation is of major importance. Remember, it is a part of your radiating system. It can be safely assumed that the better the complete ground system, the more efficient will be the radiating system. A lack of complete grounding of the transmitting and audio equipment may cause trouble from stray rf getting into the audio, and may cause unstable transmitter performance, etc. It is wise to bond all electrical conduit, water piping, metal building framework to the overall ground system. If these suggestions are followed, there will be less trouble over the years, as the ground system ages.

1-28. ANTENNA COUPLING

1-29. Antenna coupling equipment not involved in these instructions is a very important part of the entire successful operation. The instructions supplied with the antenna coupler will aid in its adjustment. As all radiating towers must be measured electrically by an approved engineer, he could check and advise on the tune-up of the antenna coupler. If your operation is directional the engineer will, of course, tune the entire directional system, which includes the antenna coupling equipment.

1-30. TECHNICAL CHARACTERISTICS

RATES POWER OUTPUT:	1000/250 watts. Capable of 1100/275 watts, if necessary, to overcome possible losses in directional arrays.
FREQUENCY RANGE:	2000 kHz to 540 kHz
PRIMARY POWER INPUT:	230 volts, 3 wire, solid neutral, single phase 50 to 60 Hz. Approximately 3850 watts consumed at 100% tone modulation, at 1000 cycles.
FREQUENCY STABILITY:	±5 Hz within temperature range of 50 to 122°F.

ELEVATION:	6500 feet.
VENTILATION NECESSARY:	Provision should be made to allow 1500 CFM of clean, outside air under all circumstances.
AUDIO INPUT:	16 dB, ±2 dB, for 100% modulation for both output powers.
INPUT AUDIO IMPEDANCE:	As supplied, 600 ohms, which will also serve to match 500 ohms satisfactorily. Input may be connected for 150/250 ohms, if desired.
FREQUENCY RESPONSE:	±1.5 dB, 30 to 12,000 Hz
DISTORTION:	Rated at 3% from 50 to 10,000 Hz, at 95% modulation.
NOISE:	60 dB, or better, between 0 and 100% modulation.
CARRIER SHIFT:	3% or less, between 0 and 100% modulation
RF OUTPUT IMPEDANCE:	Will match resistive loads from 50 to 70 ohms.
DUMMY ANTENNA:	51.5 ohms, built in
TUBES USED:	(2) 12BY7A, Osc. & 1st IPA (6) 807, Audio & 2nd IPA (4) 833A, Power Amp. & Modulators
	Silicon rectifiers are used in bias, intermediate voltage and high voltage supplies.
OPTIONAL TUBE RECTIFIERS IF USED:	(2) 866A, Low Voltage Rectifiers (2) 8008, High Voltage Rectifiers
CRYSTALS	Vacuum, ovenless, octal based - Provision for two.
EXPORT PACKING INFORMATION	Product: BC-1G No. of Pkgs: 4 Gross Wt: 1400 Cubage: 102.3 Largest Box: 39 x 47 x 84

SECTION II

INSTALLATION

2-1. GENERAL

2-2. This section contains information for personnel installing and operating the BC-1G Transmitter. The following mentioned points should be studied so that the unpacking and set up procedure will be well in mind when doing the actual work.

2-3. INSTALLATION

2-4. INSTALLATION HINTS

a. Check all packing lists for materials supplied.

b. Study the technical manual before attempting to set up the equipment.

c. Have the transmitter location clean so that the various parts can be safely placed out of harms way when the unit is unpacked.

d. It is well to have a mounting base set in place upon which the transmitter can be set. This base can be made from 2" x 4" lumber. It should be lagged to the floor and measures taken to insure that the top side of the frame is perfectly level. This will give a good, solid, level base on which the transmitter can be set. This procedure also allows the external transmitter wiring to enter the cabinet from practically any point underneath and be run to the entry holes provided in the base of the cabinet. See drawing 813 7924 001 for base layout and dimensions.

e. Use heavy primary wire from the building switchbox terminals to the transmitter fuse block. #4 copper wire should be suitable for these leads.

f. Be sure the power company has installed large enough service for all the equipment; transmitter lights, water pump etc., which will be used at the transmitter site.

g. Do a good job of installing the equipment. Time spent in making the installation as good electrically and mechanically as possible, will pay off in the future by insuring less off-the-air time.

2-5. TRANSMITTER INSPECTION

2-6. All packing material, string, tape, etc., should be removed. All relays should be inspected for free travel of armature and contacts. Heavy components, such as the high voltage power transformer, high voltage swinging choke, modulation transformer and modulation choke are shipped separately, each in its own box.

2-7. Tubes and crystals have also been removed from transmitter, these too are packed separately. The small, glass enclosed time delay relay is shipped in its socket, on the panel and shelf assembly.

2-8. Go over the complete transmitter. After traveling a long distance a fastener could come loose. Put a screwdriver or wrench to all nuts and bolts. This work may take an hour or so, but may save loss of air time later on.

2-9. TRANSMITTER CONNECTIONS

2-10. After the transmitter has been uncrated and placed in its final operating position, the external connections can be made to it. These connections will be outlined and each one will be gone over in detail.

2-11. PRIMARY POWER. This line will supply the power requirements of the transmitter. For good regulation the wire size is important. We have suggested #4 wire from the wall switch box to the transmitter. This service calls for the three wire, 230 volt installation; in other words, 115 volts each side of a solid neutral. The two hot wires should be #4, the neutral can be smaller in size, if desired, but in no case smaller than #8. These wires can be brought into the cabinet at the right hand rear corner (as viewed from the front). Make sure the wall switch is in the OFF position. Connect the three primary wires to the transmitter fuse block XF1.

2-12. TRANSMITTER GROUND. A large ground stud is located on the cabinet frame very close the the modulation transformer, T41. Connect a good ground strap from this stud to the ground system of the station. A copper strap 1" or 2" in width will do. Ths strap may enter the cabinet through the access hole in the base at the right rear through which the ac primary wires enter.

2-13. AUDIO INPUT. The audio input pair should be in shield, the two audio wires should be connected to terminals #14 and #15 on TB2. The cable shield can be grounded on terminal #13 of TB2.

2-14. MODULATION MONITOR. The modulation monitor should be connected to terminals #13 and #14 of TB1A. Solid dielectric coaxial cable, such as RG62/U can be used for this connection. TB1A-14 is the "Hot" wire, TB1A-13 is ground.

2-15. FREQUENCY MONITOR. The frequency monitor should be connected to terminals #30 and #29 (29 ground) on TB2. This connection can also be made up on RG62/U coaxial cable, the center wire connecting to terminal #30. Ground the shield to #29.

2-16. RF OUTPUT. Connect the coaxial transmission line center conductor the ceramic feedthru insulator stud. This feedthru insulator is located near the output loading coil, L42. You may run the coaxial line either through the top of the cabinet, through a hole provided there, or up through the base. In any event, be sure the outer shield, or conductor is totally grounded to the transmitter cabinet and to the station's ground system.

2-17. REMOTE CONTROL (IF USED). If the transmitter is going to be remotely controlled using RDC-10C remote equipment, the following information must be used for making the connections.

2-18 Detailed Instructions for Remote Control Connections. With facilities already available in the BC-1G circuitry for remote filament ON/OFF, remote RESET and remote plate OFF, it is only necessary for the customer to install the small motor assembly to actuate the plate rheostat R41 and the supplemental relay K1A which operates the 250/1000 watt carrier function.

2-19. Plate Rheostat Motor Assembly. The plate rheostat motor assembly #994 6326 001 has full mechanical information supplied with the kit to allow for easy installation in the transmitter, suitable brackets, sprockets and chain are included. With this motor and associated components installed, the following connections must be run from the motor bracket terminal board TB1, to the RDC-10C Transmitter Control Unit.

a. Terminal #1 connects to TB2-26 in RDC-10C unit.

b. Terminal #2 connects to cabinet ground stud.

c. Terminal #3 connects to TB2-28 in RDC-10C unit.

d. Terminal #4 connects to TB2-17 in RDC-10C unit.

e. Terminal #5 connects to cabinet ground stud.

f. Connect a wire from TB1-4 in the BC-1G Transmitter to TB2-27 in the RDC-10C Transmitter unit. This connection carries hot 115 volts ac to the transmitter unit from the F1 side of the line within the BC-1G Transmitter. (115 volt ac between TB1-4 of BC-1G transmitter and ground).

2-20. Remote Power Change. The BC-1G has in-built provisions to change power from 1000 watts to 250 watts and back to 1000 watts. The two power change contactors K2 and K3, working in conjunction with plate auxiliary relay K9, and the front-of-cabinet pushbutton switches marked "Reset" S42, "Plate Off" S43, "Low Power" S44 and "High Power" S45, perform the function of changing carrier power. Suppose we are operating at 1000 watt carrier power and wish to drop carrier power to 250 watts, the sequence of switching is as follows.

2-21. S43, the "Plate Off" button is depressed, causing auxiliary plate relay K9, to drop out; its contacts A-B and C-D open. Contacts A-B control ac voltage to low and high power contactors K3 and K2. (As we were on 1000 watts, the high power contactor K2 deenergizes, removing primary voltage from the high voltage power transformer T40), the carrier is now off. "Reset" button S42 is then momentarily depressed, again setting up and locking in auxiliary relay K9. This operation then makes it possible to select the low power contactor K3, by depressing "Low Power" button S44 momentarily. Contactor K3 pulls in, energizing the primary of high voltage power transformer T40, with 115 volts ac. This action along with several other circuit changes (all made by contactor K3) allows the BC-1G to operate on 250 watts carrier power.

2-22. By Remote control, these power change functions are performed as follows:

a. Place switch S1, function switch, on the front panel of the RDC-10C Studio Unit to position #2. The remote plate current meter will read plate current.

b. Place switch S6, the plate On/Off switch on the front panel of the RDC-10C Studio Unit, to its "Off" position momentarily, this will de-energize auxiliary plate relay K9, in the transmitter. The transmitter is now off the air, the remote plate current meter should read zero.

c. Place the plate ON/OFF switch S6, of the Studio Unit, momentarily to its ON position. This energizes the coil of auxiliary relay K9, causing it to again lock in and at the same time providing 230 volts ac for possible use by K2 or K3 contactors.

d. Now operate the Raise/Lower switch S4, on the panel of the RDC-10C studio unit. "Raise" for high power, "Lower" for low power. Assuming 1000 watt carrier operation is desired, S4 will be placed momentarily in its "Raise" position. This will complete the circuitry to the coil of high power contactor, K2, causing it to pull in and lock, putting 230 volts ac on the primary of high voltage power transformer, T40.

2-23. The following connections must be made between the BC-1G Transmitter and the RDC-10C Transmitter unit, to perform this high power/low power function. It will use stepper position #2.

2-24. A supplemental 6 volt dc relay K1A, having two sets of "A" contacts must be installed in the BC-1G Transmitter, this relay is included in remote control kit #994 6326 001. This relay will be mounted in the space provided on the "Panel and Shelf", see drawing 813 7961 001 for physical location of supplemental relay K1A, also drawing 813 7928 001 for K1A connections. These connections are as follows.

a. Coil K1A-1 connected to TB1-20 in BC-1G.

b. Coil K1A-2 connected to TB1-26 in BC-1G.

c. K1A-5, normally open contact, is connected to TB1A-15 in BC-1G Transmitter.

d. K1A-4, normally open arm, is connected to TB2-6 in BC-1G.

e. K1A-8, normally open contact is connected to TB1-30 in BC-1G Transmitter.

f. K1A-7, normally open arm connects to TB2-8 in BC-1G Transmitter.

2-25. With the supplemental relay K1A installed and connected, the external connections to the RDC-10C Transmitter Unit can be made:

a. TB1-30 in BC-1G must connect to TB2-28 in RDC-10C Transmitter Unit.

b. TB1A-15 in BC-1G connects to TB2-26 in RDC-10C Transmitter Unit.

c. TB1-20 in BC-1G connects to TB2-25 in RDC-10C Transmitter Unit.

d. TB1-26 in BC-1G connects to TB2-16 in RDC-10C Transmitter Unit.

NOTE

These functions make use of stepper position #2.

2-26. Reset, Plate Off (Setting Up Auxiliary Relay K9). Three connections must be made between the BC-1G Transmitter and the RDC-10C Transmitter unit. They are:

a. TB2-3 in BC-1G must connect to TB2-29 in RDC-10C Transmitter Unit.

b. TB2-4 in BC-1G connects to TB2-30 in RDC-10C Transmitter Unit.

c. TB2-5 in BC-1G must connect to TB5-2 in RDC-10C Transmitter Unit.

NOTE

A jumper must be added in the RDC-10C Transmitter Unit, from TB2-30 to TB5-1.

2-27. Remote Plate Voltage Indication. There are two connections which must be made between the BC-1G transmitter and the RDC-10C transmitter unit.

a. The positive terminal of the plate voltage extension in the BC-1G transmitter, TB2-9 must be connected to TB2-1 in the RDC-10C Transmitter Unit.

b. The negative terminal of the plate voltage extension in the BC-1G transmitter, TB2-10 must be connected to TB2-25 in the RDC-10C Transmitter Unit.

NOTE

This function is on position #1 of the RDC-10C Studio Unit.

2-28. Remote Plate Current Indication. There are two connections which must be made between the BC-1G Transmitter and the RDC-10C Transmitter Unit.

a. The positive terminal of the plate current extension TB2-12 in the BC-1G must be connected to TB2-2 in the RDC-10C Transmitter Unit.

b. The negative terminal of the plate current extension TB2-11 in the BC-1G Transmitter must be connected to TB2-25 in the RDC-10C Transmitter Unit.

NOTE

This function is on position #2 of the RDC-10C Studio Unit.

2-29. Remote Tower Light Indication. We must connect the remote tower light indication kit into the RDC-10C transmitter unit. This will be accomplished by the installation of the M5143 current transformer. It will be mounted with one leg of the tower lighting circuit passing through it. There are two external connections out of the transformer which must be connected to the RDC-10C Transmitter Unit.

a. One lead connects to TB2-4 in the RDC-10C Transmitter Unit.

b. The second lead connects to TB2-25 in the RDC-10C Transmitter Unit.

NOTE

This function is on position #4 of the RDC-10C Studio Unit.

2-30. Remote Antenna Current Metering. For remote transmitter operation, a method of metering the antenna current is required. The HARRIS M5862 kit will do this. Install this equipment mechanically as given in the instructions supplied. Connect the two leads as follows:

a. Negative lead to TB2-25 in RDC-10C Transmitter Unit.

b. Positive lead to TB2-3 in RDC-10C Transmitter Unit.

With stepper positioning switch in Studio Unit set to position #3 (ant. cur.), this remote rf current indication will be read on meter M3.

NOTE

When the BC-1G Transmitter is being set up for remote control operation, a jumper wire normally connected between TB2-4 and TB2-5 in the transmitter, must be removed.

2-31. The Local/Remote toggle switch S40, located on the right hand corner post of the cabinet, above the pushbutton switches, must be placed in the "Remote" position.

2-32. STUDIO PROCEDURE, FOR REMOTE CONTROL OPERATION. This information will describe the actual switch manipulations of the RDC-10C Studio Unit which are necessary to perform the following functions.

a. Place BC-1G Transmitter on air, with 1000W carrier.

b. Place BC-1G Transmitter on air, with 250W carrier.

c. With transmitter operating at 1000 watts, to drop power to 250W.

d. With transmitter operating at 250W, to increase power to 1000W.

e. To raise or lower transmitter power by means of plate rheostat.

f. With transmitter operating, to have power failure at studio.

g. With transmitter operating, to have power failure at transmitter.

h. To completely close down transmitter.

2-33. Placing The BC-1G On The Air With 1000 Watt Carrier.

a. RDC-10C Studio Unit must be turned on.

b. Filament switch S3 of Studio Unit must be turned to ON position.

c. Allow 10 to 15 seconds for transmitter time delay to heat and close.

d. Momentarily operate switch S6 (Plate ON/OFF)* to its ON position (up for ON).

e. Place stepper positioning switch S1 of RDC-10C Studio Unit to position #2. This position normally reads PA plate current.

f. For high power (1000W) carrier ON, operate RAISE/LOWER switch S4 to "UP" (raise) position momentarily. Transmitter is now operating on 1000 watts.

2-34. Placing the BC-1G On The Air With 250 Watt Carrier. Follow steps a, b, c, d, e as described in paragraph 2-33.

f. For low power (250W) carrier ON, operate RAISE/LOWER switch S4 to "DOWN" (lower) position momentarily. Transmitter is now operating on 250 watts.

2-35. With Transmitter Operating At 1000 Watts, To Drop Power To 250 Watts.

a. Set stepper positioning switch to position #2 (plate current).

b. Operate Plate ON/OFF* switch S6 momentarily to its "OFF" (down) position.

c. Now operate same switch, S6, momentarily to its "ON" (up) position.

d. Operate RAISE/LOWER switch S4 momentarily to its "LOWER" (down) position.

2-36. With Transmitter Operating At 250 Watts, To Raise Power. Follow steps a, b, and c as described in paragraph 2-35.

d. Operate RAISE/LOWER switch S4 momentarily to its "RAISE" (up) position.

2-37. To Raise Or Lower Transmitter Power By Means Of Plate Rheostat.

a. Set stepper positioning switch of Studio Unit to position #3 (ant. current).

b. Operate RAISE/LOWER switch S4 to "RAISE" (up) position to increase plate voltage. This operation will be indicated by the increase of antenna current on meter.

2-38. Operate RAISE/LOWER switch to "LOWER" (down) position to decrease plate voltage; thus, lowering rf output of transmitter.

2-39. Transmitter Operating, Having Power Failure At The Studio. If the Studio commercial power would fail momentarily while the BC-1G Transmitter is on the air, the following functions must be performed to return transmitter to air.

a. Set stepper positioning switch S1 of RDC-10C Studio Unit to position #2.

b. Operate S6 (Plate ON/OFF*) to "ON" (up) position momentarily.

c. Operate switch S4 (RAISE/LOWER) to "UP" position momentarily for 1000W carrier, or the "DOWN" position momentarily for 250 watt carrier.

2-40. Transmitter Operating, To Shut Down At End Of the Day. To shut down transmitter completely at close of broadcast day the following operations should be made:

a. Operate switch S6 (Plate ON/OFF*) of audio studio unit of RDC-10C to its "DOWN" (off) position.

b. Operate switch S3 (filament) to its "DOWN" (off) position.

* It is called to the attention of operating personnel that the Plate ON/-OFF switch is used as a "RESET" function switch in its "UP" position, as a "PLATE OFF" switch (as marked) in the "DOWN" position, when the RDC-10C Studio Unit is working in conjunction with a BC-1G Transmitter.

2-41. CRYSTAL INSTALLATION

2-42. The M5422 Oscillator Unit has provisions for two vacuum, glass mounted crystals. These crystals are octal based and plug directly into the crystal sockets XY1 and XY2. Remove thumb screw which secures the oscillator cover. Remove the cover. Plug in the crystal, or crystals, to be used. Be sure it is correctly marked, as to the operating frequency. At this same time place the two 12BY7A tubes in this unit, then replace the cover and secure same with the thumb screw.

SECTION III

THEORY OF OPERATION

3-1. INTRODUCTION

3-2. This section of the technical manual will include the theory of operation of the M5422 Oscillator Unit when combined as an integral part of this 1000/250 watt Transmitter. A general description of the complete, overall transmitter operation will be given.

3-3. THEORY

3-4. M5422 OSCILLATOR UNIT, SIMPLIFIED THEORY

3-5. This oscillator unit uses a 12BY7A oscillator tube, V1, driving another 12BY7A, V2, the first IPA. The 12BY7A oscillator tube operates in a crystal controlled grid plate circuit, also referred to as a ground plate Colpitts circuit. Excitation is controlled by the proper ratio of the two capacitor values of C3 and C4.

3-6. M5422 OSCILLATOR UNIT, DETAILED THEORY

3-7. This oscillator unit has facilities for two vacuum and glass enclosed crystal assemblies. Each crystal can be selected for use by means of the rotary switch, S1. (One crystal is needed for operation, the second, if used, would be a spare).

3-8. These crystals are mounted in octal based, glass envelopes which have been pumped to a high vacuum. These plug into octal sockets in the oscillator unit. The crystals are of the low temperature co-efficient type so there is no need for crystal heater ovens for normal operation.

3-9. Frequency trimmer capacitors, C1 and C2, are tunable from the front - these capacitors are connected in shunt with the crystals and afford a slight frequency adjustment which can be used during initial tune-up. Also, aging of the crystals could cause a slight frequency change during day to day operation. This change can be compensated for by re-adjustment of these capacitors.

3-10. 12BY7A FIRST IPA. This tuned first IPA stage is lightly capacitively coupled to the oscillator. Its output circuit L3 and C9, is used on frequencies for 1600 kHz, from 800 kHz to 540 kHz a padder capacitor, C11, 100 mmfd. mica is connected in parallel with capacitor, C9. The output of this stage is capacitively coupled to the grid circuit of the two 807 second IPA tubes, through C10 in the oscillator unit and C8 in the 807 stage. Adequate drive of from 2 to 5 mA., depending upon operating frequency is provided form the two 807's. Approximately 180 to 210 volts dc is applied to the oscillator unit, being supplied by the 625 volt power supply through dropping resistor, R5.

Drive voltage for operation of a Frequency Monitor, such as the HARRIS M4990, is provided. The monitor drive output is obtained from the plate circuit of the 1st IPA stage. A small coupling capacitor, C12, is used.

3-11. BC-1G TRANSMITTER, SIMPLIFIED THEORY

3-12. The following information will briefly describe this transmitter, giving tube line-up and circuitry of the audio and rf sections along with the various power supplies used.

3-13. As mentioned previously, the M5422 Oscillator Unit uses a 12BY7A oscillator and a 12BY7A first IPA. This stage drives a pair of 807's second IPA, which in turn supplies the driving power for a pair of 833A tubes operating in parallel as the modulated Class "C" power amplifier.

3-14. The audio system uses a pair of push-pull 807's as the audio input amplifier, these driving another pair of 807's operating as a cathode follower stage which in turn drives the two Class "B" 833A modulators tubes, these tubes in turn high-level plate modulate the 833A's in the rf power amplifier.

3-15. The bias supply uses silicon rectifiers. The intermediate voltage supply makes use of silicon rectifiers in a full-wave center tapped configuration. Silicon units are used in the high voltage, full-wave center tapped rectifier.

3-16. BC-1G TRANSMITTER, DETAILED THEORY

3-17. The BC-1G transmitter uses the M5422 oscillator unit to drive the two 807's operating in parallel as the rf driver stage. This stage operates with approximately 600/625 volts on the plate of the tubes, 400 volts on the screens, and 60 to 65 volts negative on the grids. Forty-five (45) volts of this bias is fixed, being supplied from the small bias power supply, this voltage is sufficient to limit the plate dissipation to an allowable value in the event that grid excitation is lost. In normal operation, the cathode current of this 807 rf driver stage will run from 150 to 200 mA total for both tubes, varying somewhat with operating frequency and loading. This current is indicated on the multimeter when the multimeter switch is set in the "RF Driver Cath." position. With this same selector switch set in the "RF Driver Grid" position, grid current to the 807 rf driver stage will be indicated. This will be on the order of 2 to 5 mils.

3-18. The plate and screen voltages of the 807 rf driver are modulated slightly, this feature tends to increase the rf drive to the modulated power amplifier on peaks of the modulation cycle, this improves the distortion figure of the transmitter.

3-19. The rf driver stage is capacitively tuned by the 250 pf. variable capacitor, C4. Below 1150 kHz, a padding capacitor must be connected in parallel with C4.

3-20. The power amplifier of the transmitter uses two 833A tubes connected in parallel . The output circuit of this PA stage can be said to be made up of an "L" for two "T" networks, which effectively transform the operating tube impedance down to the 50/70 ohms found at the line terminal of the transmitter. This network also reduces to a minimum, the transmission of harmonics which might be generated in the transmitter.

3-21. Power amplifier coils L40 and L42 are of the continously variable type and are used to tune the power amplifier to resonance, in the case of L40, and to vary the loading by means of L42. Other than the neutralizing capacitor C40, there are no variable air dielectric capacitors used in the power amplifier of this transmitter. This adds greatly to its reliability.

3-22. Grid drive to the amplifier should be at least 100 mA for good operation. This will be indicated by the multimeter when the multimeter selector switch is in the "Power Amp. Grid" position. Higher grid drive up to 150 mA is acceptable, but this drive will vary slightly, depending upon the transmitter frequency. The transmitter will match 50/70 ohm unbalanced loads, delivering full power output with power amplifier plate efficiency of 70% or better. Other load impedances are available on special order.

3-23. Audio wise, the BC-1G transmitter is novel in many respects. The audio input/audio driver assembly is made up basically of components mounted on a printed wiring board. This assembly is located on the panel and shelf section of the transmitter and includes the two 807 audio input tubes, the two 807 cathode follower audio driver tubes, along with the balance control, R3, condensers and resistors for these two stages. The audio system is push-pull in operation for all stages. The cathode follower audio driver tubes, V3 and V4, are biased by voltage controlled by the potentiometers, R2 and R1, located on the small aluminum front panel. These controls indirectly adjust the operating bias on the modulators by varying the operating constants of the cathode followers, this causes a bias voltage change on the modulators by having a voltage drop occur across the high resistance cathode resistors, R11 and R12, of the cathode followers. A very smooth modulator bias change can be attained in this manner, making it possible to adjust the modulators for correct operating conditions. There is no metering of the plate current of the 807 cathode followes, V3 and V4, it is believed that if proper modulator operation is had, then the 807 cathode followers are operating satisfactorily.

3-24. High level Class "B" modulation is used in the BC-1G, a pair of 833A tubes providing the means. The grids of the modulators are excited by the two 807 choke follower audio driver. The output of the modulators is coupled to the Class "C" amplifier by means of the capacitor C45, and the reactor L47. The secondary of the modulation transformer T41 does not carry any power amplifier dc.

3-25. Feedback from the plates of the modulators back to the audio input tube grids has been provided. A small feedback ladder printed wiring board is located on the panel and shelf assembly directly above the modulation transformer, T41. By means of a resistor-capacitor divider network out-of-phase voltage is fed back to the audio input. The transmitter makes use of approximately 12 to 14 dB of feedback measured at 1000 Hz and 90% modulation. This feedback helps to reduce the noise and also improves the distortion figures.

3-26. The power amplifier and the modulator plate circuits are protected against abnormally high overload currents by means of relays K6 and K7. These are located on the top shelf of the "panel and shelf" assembly, adjacent to the multi-winding filament transformer, T3.

3-27. The overload relays, K6 and K7, have their coils shunted by 20 ohm semi-variable resistors. By adjustment of the slider tap, the relay pull-in point can be selected. These resistors have been set at the factory for normal operation. K6, the modulator overload will pull in at a modulator total plate current of approximately 600 mA. (Normal plate current for voice and music programming, hitting 100% will be around 400 mA total.)

3-28. PA overload K7 is set for approximately 700 mA pull-in (normal PA plate current will range from 525 to 600 mA, depending on PA transmitter efficiency). These relays may pull-in prematurely during sine wave audio modulation at the 100% level. In this event the adjustments can be made to allow for this type of operation.

3-29. If the current in either circuit exceeds the value for which its relay was set, the relay will energize, causing its normally closed contacts to open, which in turn opens the coil circuit of auxiliary relay, K9. This causes the contacts of relay K9 to return to their normally open position; thus, opening the coil circuit of the high or low power contactor (whichever had been in use), this removes primary voltages from T40, the high voltage power transformer.

3-30. POWER SUPPLIES, DETAILED THEORY

3-31. The BC-1G, 1000/250 watt, Transmitter makes use of three separate power supplies. These use full wave, C.T. rectifier and filter assemblies. Each of the three silicon supplies used in the transmitter will be fully described in the following paragraphs.

3-32. BIAS SUPPLY. This supply is made up of a plate transformer, T1, working in conjunction with the bias rectifier, a silicon rectifier consisting of 10 diodes, 400 volts, PIV, filter choke L1, filter capacitor, C3, and associated resistors and potentiometers. The bias potentiometers, R1 and R2, indirectly vary the modulator bias by controlling the cathode follower bias and, thus, the current flow through the cathode follower resistors, R11 and R12. There is applied a negative 280 volts between these resistors and ground. An opposing voltage of approximately 210 volts is developed by current flow through R11 and R12; thus, putting the difference (about 60 to 70 volts) on the grids of the modulators. This bias supply also supplies 45 volts of fixed bias to the two 807's in the rf driver stage. This voltage is obtained by a tap on bias resistor, R12. This bias supply is energized at the time that the filament start button, S41, is depressed.

3-33. 600/625 VOLT LOW VOLTAGE SUPPLY. This supply uses 14 diode units of 600 volt PIV rating working as a full wave C.T. rectifier, with a choke input filter system. Choke L46 is rated at 10 hy., capacitor C47 is a 10 mfd unit. This supply develops approximately 600/625 volts which is applied to the two 807 rf driver tubes. The same voltage is dripped to around 575 volts through series resistor, R4, and applies to the two audio stages. The M5422 oscillator unit derives its plate potential from this same power supply, the voltage being dropped to approximately 195 volts by means of series resistor, R5.

3-34. This supply has a time delay relay, K8, connected in its primary, which delays the application of this low voltage for approximately 10 seconds after the filament voltage has been applied. This supply also has its primary in series with door interlock switches S46 and S48. If either the front protective screen or the back cabinet cover is not securely in place this supply will be in-operative.

3-35. 2800 VOLT SUPPLY. High voltage for the power amplifier and modulator is developed by two silicon rectifier assemblies, each consisting of 30 diode units of 600 volt PIV rating working as a full wave C.T. rectifier. This supply is capable of delivering slightly over one ampere dc. The main power transformer, T40, the filter choke, L45, and filter capacitor, C48, are located in the bottom section of the transmitter cabinet. This high voltage supply is interlocked with the front panel grill and the interlock switch, S47. As mentioned previously, this transmitter has a metal grill work covering the front of the unit, this protects the operating personnel from the dangerous high voltages which are present inside the transmitter cabinet. The lower edge of the protective grill is secured by two quick operating ON/OFF fasteners. When this grill is in place, its lower edge operates the safety door interlock switches, S46 and S47.

3-36. High Voltage Supply Operation At 250 Watts Output. The BC-1G 1000/-250 watt Transmitter can operate at 250 watts. This is made possible by reducing the primary voltage applied to the high voltage transformer, T40. For 1000 watt operation, this primary voltage is approximately 230 volts; for 250 watt carrier output this primary voltage is dropped to 115 volts. This develops around 1350 volts through the supply which is applied to the power amplifier and modulators.

3-37. BC-1G Power Change Facility. The operation of the BC-1G Transmitter at either 1000 watt or 250 watt carrier level is accomplished by the operation of two power contactors, (K2 or K3) and one auxiliary relay, K9. The relay and contactor operating sequence is as follows:

3-38. For 250 watt carrier - Filament OFF/ON pushbutton switch, S41, is depressed. All filaments are energized, and after another 10 seconds, time delay relay, K8 has closed. With both front screen and rear cabinet cover in place, the neon indicating lamps of "Filament" switch S41, the red "Reset" button S42 and the white "Plate Off" button S43 will be illuminated. A check of the multimeter switch positions will show all multimetered circuits indicating correctly, the multimeter switch can be left in the PA grid current position. Relay, K9, must now be locked in, this action will provide a 230 volt ac source for either high power contactor, K2, or low power contactor, K3. Press the red "Reset" button S42; this operation will complete the auxiliary relay, K9, coil circuit, causing it to lock in. A pair of normally open contacts A and B close, this makes 230 volts ac available for contacts K2 or K3. When the red "Reset" button was pressed, the neon lamp indication of both the "Reset" and the "Plate Off" will go out. Now press the amber button marked "Low Power", S44. This will complete, the coil circuit of the low power contactor K3, causing it to lock in. The amber button will now be lit up, indicating operation on 250 watts. When low power contactor, K3, locks into position, the following functions are performed:

a. Contacts A-B and C-D, which are normally open now close; this completes a 115 volt primary circuit to power transformer T40, for 250 watt operation.

b. Contacts E-F, these being normally closed, are now open, this operation makes it electrically impossible to energize high power contactor, K2.

c. Contacts G-H, normally open, are now closed, acting as holding contacts for this low power contactor, K3.

d. Contacts I-J, normally closed, are now open. They remove the short across resistor R34, this allows the output of the modulation monitor pickup to remain at essentially the same level as it is for 1000 watt carrier output.

e. Contacts K-L, normally closed, now open, changing modulator bias.

f. Contacts M-N, normally open, are now closed. This operation adds resistor R14, in shunt with the 3600 ohm resistor in audio pad AT1, effectively reducing the audio input level to that required for 250 watt operation.

3-39. For 1000 watt carrier - To go from 250 watt to 1000 watt operation, the following procedure must be followed:

a. Press the "Plate Off" button, this will open the holding circuit of coil of auxiliary relay, K9, causing it to drop out; thus, removing energizing voltage to coil of low power contactor K3. K3 then drops out, returning all seven sets of contacts to their normal positions. (When in their normal positions, all circuitry is set up for 1000 watt carrier operation). This removes primary voltage from high voltage power transformer, the transmitter is now off the air.

b. Press the "Reset" switch which again locks up auxiliary relay, K9, providing source of 230 volt ac for the selected plate contactor. Now press high power switch, S45. This will energize the coil of high power contactor K2, causing same to lock up.

This action puts 230 volts ac on the primary of high voltage power transformer T40. The transmitter is now on air with carrier of 1000 watts.

NOTE

> The BC-1G transmitter must have its carrier removed from air before any change in output power level can be made. Also, in the event of a power outage, the carrier will be removed from the air.

3-40. ATTACHMENT OF REMOTE CONTROL

3-41. The BC-1G 1000/250 WATT BROADCAST TRANSMITTER has most provisions for remote control built directly into its circuitry. It is necessary for the customer to purchase only the kit (part #994 6326 001) containing the reversible motor assembly which works with the plate rheostat, R41 and the auxiliary relay K1A, to operate the power change. All other remote facilities are brought out to terminal boards located on the "panel and shelf" assembly. These terminations are as follows:

TB2-9 & 10 - Remote Plate Voltmeter.

TB2-11 & 12 - Remote Plate Current Meter.

TB2-6 & 7 - High Power (momentary make).

TB2-7 & 8 - Low Power (momentary make).

TB2-3 & 4 - Reset (momentary make).

TB2-4 & 5 - Plate Off (momentary break).

TB2-1 & 2 - Filament On/OFF. These connections (TB2-1 & 2) must be held closed by contact to provide "Fail Safe" operation. If studio telephone control line would open up, the complete transmitter would de-energize, removing carrier from the air.

The overall schematic #852 5878 001 clearly shows the above mentioned connections.

SECTION IV

TUNING PROCEDURES

4-1. TUNING PROCEDURE, 1000 WATT CARRIER

4-2. For tuning we will use 1400 kHz as an example. The same information will be usable for tuning the transmitter to any frequency within the broadcast band. The tuning chart furnished in this book will spell out the component value for the parts which must be changed to put the transmitter on any specific frequency. When this transmitter was shipped from the factory the correct components had been installed for the operating frequency specified.

WARNING

USE EXTREME CARE WHEN TUNING UP THE TRANSMITTER, HIGH VOLTAGES WILL BE PRESENT. DO NOT STRAP OUT DOOR INTERLOCKS. WE SUGGEST TWO PEOPLE BE PRESENT DURING THE INTITAL TUNE-UP SO ONE MAY OBSERVE THE OTHER'S ACTIONS. USING NORMAL CARE AND AVERAGE INTELLIGENCE, OPERATION AROUND HIGH VOLTAGE CAN BE COMPLETELY SAFE.

4-3. PRELIMINARY TUNE-UP CHECKS (TRANSMITTER LOCALLY CONTROLLED)

4-4. At this time, the switch in the station's distribution box, which supplies 230 volts to the transmitter, should be placed in the ON position. Place toggle switch, S40, in the LOCAL position.

4-5. Push the "Filament Start" switch, S41, all tube filaments should light. It is well to note here that filament switch, S41, is a push ON/push OFF type. It may have been in the ON position, and if so, the filaments would have energized at the time the wall switch was placed in the ON position. These pushbutton switches have in-built neon indicators which tell the operator when the controlled circuit is energized. Switch, S41, the filament ON/OFF control must be pressed to close and must be again pressed to open its circuit. Also at this same time the cabinet fan is running and the bias transformer, T1, has its primary energized, this providing the transmitter with its bias requirements.

4-6. After about 10 seconds the "Low Voltage" time delay relay, K8, will close it N.O. contacts, this will cause the low voltage power supply to deliver power to the oscillator unit, the rf driver stage and the audio input/audio driver stage. (This will occur if the front protective metal grill is in place, closing the door interlock switch, S46, and if the rear cabinet panel is in place to close interlock switch, S48.

4-7. Set the multimeter selector switch, S2, to the "Plate Cur. Osc./Buf" position, multimeter M40, should indicate from 20 to 25 mA. This is total cathode current of both oscillator tube and buffer tube. Now place multimeter selector switch in the "RF Driver Grid" position, the multimeter should read from 2 to 5 grid mA. If such is the case, immediately place the multimeter switch to the "RF Driver Cathode" position and read the cathode current of the 807 rf driver stage on the multimeter. Check this reading for minimum indicated current by tuning the rf driver capacitor, C4. A minimum reading will indicate resonance, this current will indicate somewhere in the range of 140 to 175 mA.

4-8. Now set the multimeter selector switch to "PA grid" position. If tuning is proper to this point, the multimeter should indicate between 100 and 150 mA grid current flowing in the 833A power amplifier grid circuit.

NOTE

At this time, if readings do not follow these instructions, it would be well to check the tuning of the M5422 oscillator unit. In the forepart of the technical manual are full detailed instructions for padding and tuning this unit. Normally, this oscillator unit will require no tuning, as it has been thoroughly checked in our factory before shipment, but if some fault has developed during shipment, these instructions should be followed explicitly. In nearly all cases, correct operation can be expected, if the grid drive to the 807 buffer stage is reading within the range of 2 to 5 mA.

4-9. At this time set the multimeter selector switch to "Input Audio" position and read current as indicated on the multimeter. This will run from 5 to 10 mA.

4-10. CHECKING FILAMENT VOLTAGE, BIAS SUPPLY AND LOW VOLTAGE SUPPLY. Remove the right hand side of the cabinet. First we check the filament voltage and its indication on the multimeter. Using a Model #260 Simpson meter or equivalent, place meter on low range ac scale. (Will measure 10 volt ac). Connect meter leads to filament connections of V40, the 833A PA tube. With filaments ON, read ac voltage. It will be somewhere between 9.5 and 10.5 volts. Set filament control R43, so that indicated ac voltage on Simpson meter is 10 volts. Now set transmitter multimeter switch S2, to "filaments volts". By use of a small screwdriver adjust potentiometer R7, located on "Panel and Shelf" so that multimeter M40, at top of cabinet, reads 10 volts, (the mark on multimeter scale). The multimeter is now calibrated for filament ac indication. Remove test leads from V40.

4-11. Using voltmeter similar to the Simpson Model #260 or equivalent (20,000 ohms per volt), measure the negative bias voltage being developed in the small bias supply. With the filament energized, there should be negative 280 volts measured from either transformer, T1, terminal #4, to ground. An alternate place to measure this voltage would be across the resistor, R12. For voltages see the "Typical Voltage Chart" in this technical manual. All voltages will vary slightly, reading of plus or minus 10% are considered satisfactory.

4-12. Check the low voltage supply. This supply delivers approximately 600/625 volts dc at the output of its choke input filter system (L46 and C47). A good place to measure this voltage would be terminal #19 on TB2 to ground. After this check, replace the cabinet side.

4-13. Turn each modulator bias control (R1 and R2) completely to its counterclockwise position. This will bias the modulators to cutoff, precluding the possiblity of these tubes from drawing high current during this phase of adjustment.

NOTE

> We will come back to these modulator adjustments later on. De-energize the filament circuit by pressing the filament ON/OFF switch S41.

4-14. CHECK POWER AMPLIFIER TUNING COMPONENTS. At this time refer to the Tuning Chart for the BC-1G which is part of this technical manual. Check the "active turns" listed for:

a. The PA Tank Coil, L40.

b. For Loading Coil, L41.

c. For Output coil, L42.

4-15. For your frequency, adjust each coil, either variable or fixed, to what is indicated on the chart. Again, these turns will vary slightly under local installation conditions. In our 1400 kHz tune-up example, we have:

a. 16.7 active turns for PA tank coil, L40.

b. 8 active turns for loading coil, L41.

c. 9 active turns for output coil, L42.

4-16. Again, consulting the Tuning Chart, we find the proper value of capacitor for your frequency. Using 1400 kHz as our example, we find:

a. PA tank padder capacitor C42 and C43 - Two Type G2, .00025 uF.

b. Input loading capacitor, C44 - .002 uF.

c. Output loading capacitor, C45 - .002 uF.

4-17. NEUTRALIZING THE POWER AMPLIFIER

4-18. Attention to this procedure is very important as complete neutralization is mandatory for good performance. The objective of the neutralizing process is reducing to a minimum the rf driver voltage fed from the input of the power amplifier to its output circuit through the grid-plate capacitance of the tubes. This is done by adjusting the neutralizing capacitor until an rf indicator in the output circuit reads minimum. BE POSITIVE THE HIGH VOLTAGE IS OFF.

4-19. A grid dip meter, a wave meter with some sort of indicator, or a flashlight lamp connected to a few turns of insulated wire will do as a neutralization indicator. Of course, a very good neutralization indicator is already built in the transmitter namely, the power amplifier grid current meter. Two methods of neutralization will be described: first, that of using the grid current meter for neutralization indication.

a. Keep the dummy load connected to the power amplifier.

b. Energize all filaments by depressing the "Filament Start" switch tab. After approximately 10 seconds, the oscillator, 1st IPA and 2nd IPA are in operating condition and grid current will be flowing in the power amplifier. (The multimeter selector switch is set on "PA Grid Cur." position).

c. Set the neutralizing condenser C40, at maximum capacity, plates fully meshed. This control is conveniently located on the top front PA panel, near the right hand corner.

d. Adjust the PA tank coil, L40, tuning by means of the right hand knob on the PA panel (marked "PA Tune"). When resonance is reached, the grid current, as indicated on the multimeter, will drop noticeably (if not neutralized).

e. Change the neutralizing capacitor setting by a small amount (gradually decreasing capacity), then re-resonate the power amplifier, noting the dip in the grid current. As the correct neutralization point is reached, the grid current dip will become less and less until complete neutralization is effected. This will be indicated by no deflection of the power amplifier grid current meter when resonance is obtained. Under these conditions the amplifier should be neutralized.

4-20. In case complete neutralization cannot be obtained, severals taps on the driver tank coil L4, are provided to aid this situation. Using the exact center tap, move the grid lead over one tap and repeat the entire neutralization procedure, as outlined above. The correct tap will always be found for satisfactory neutralization. In many instances your transmitter is tuned at the factory to your operating frequency. In this case, you will find neutralization is large a touch-up procedure.

4-21. NEUTRALIZING WITH A FLASHLIGHT BULB. The same procedure will apply as previously mentioned concerning grid current to the power amplifier. A small flashlight bulb is a sensitive and inexpensive rf indicator. The bulb should be connected in series with a couple of turns of insulated ware, approximately the same diameter, or a bit smaller, than the power amplifier tank coil, L40.

4-22. Place this coil and lamp rf indicator in close inductive relation with L40.

a. Set the neutralization capacitor at maximum capacity.

b. Very carefully tune the power amplifier toward the resonance point. It is very important to tune slowly because if the resonance point is obtained quickly, there most likely will be sufficient rf in the power amplifier tank to burn out the flashlight bulb.

c. Adjust the coupling between the lamp coil and L40 so that the lamp will glow brightly when resonance is reached. Now decrease the neutralizing capacitor's capacity a bit, the lamp brilliance will decrease, adjust the power amplifier tuning again for resonance, which may cause the lamp to brighten up a bit. Continue this operation until the lamp goes out. The amplifier will be satisfactorily neutralized under this condition.

d. Remove the lamp and coil rf indicator from the transmitter. Remember, all of these neutralizing procedures are done with the high voltage removed from the power amplifier.

4-23. POWER AMPLIFIER TUNING

4-24. We are ready, after neutralizing is complete and satisfactory, to tune the power amplifier. This is the large final rf amplifier that puts out the power, so we go about it carefully and methodically. Your overload relays should protect the equipment if you do anything wrong, but here we are dealing with power - so watch the power amplifier plate current meter, and if readings get too high (above 700 ma), check your overload relays to see why they are not operating.

4-25. The 833A tubes may have a cherry red glow in the center of their plates. This is normal, but a deep red spread all over the plate of the tube, usually indicates excessive current and will be indicated on the plate current meter.

4-26. Turn off all primary voltage by pressing the "Filament Stop" tab. We have earlier set all tank and loading coils to the proper "active turns", as shown in the tuning chart. Also, the correct capacitors are installed for the operating frequency.

4-27. Remove the front screen, again be sure all voltage is OFF. Now connect one lead from one silicon assembly to a secondary connection on high voltage T40. Leave the other high voltage OFF of the power transformer. Make sure it is not shorted or grounded at its free end. This set-up will provide partial plate voltage for the tune-up of the power amplifier.

4-28. Now replace the perforated front cabinet screen. Turn on the transmitter by pressing the "Filament Start" button. Allow time for the time delay relay to operate. Check to be sure you have PA grid current of from 120 to 150 ma. We are ready for our first try of the power amplifier.

4-29. Press the "Reset" button, S42. This in turn energizes the auxiliary plate relay, K9. This relay locks itself closed, and by means of a second set of contacts which are now closed, sets up 230 volts ac to become available for operation of either the low power contactor K3, or high power contactor K2. As we are preparing the transmitter to operate on 1000 watts, the pushbutton designed "High Power" (white, S45) is depressed, this closes high power contactor K2, which locks itself up, putting 230 volts ac on the primary of high voltage power transformer T40. Immediately adjust the "Power Amplifier Tune" control for lowest plate current reading on the "PA Plate" meter. Keeping this control in one hand adjust the "PA Loading" control. If current goes up readjust the "Power Amplifier Tune" for lowest current. When you reach about 200 mA at 900 volts, you are near normal loading and tuning. 175 mA at around 950 or 1000 volts is just about normal, but plate current must have above 200 mA would indicate improper tuning or loading.

4-30. If the amplifier has been tuned up and meets the above conditions, you are ready to apply the full high voltage. Shut down the transmitter by pressing the "Filament Stop" button. The plate voltage is interlocked with the filaments, when the filaments are de-energized, this shuts down the transmitter completely. Remove the front of perforated screen - then look to see that all tubes are de-energized. Now attach the other high voltage lead (which has been disconnected) to the secondary of the power transformer T40. This will make the high voltage power supply effective. Again, replace the front protective screen, this will definitely close the low and high voltage interlock switches, S46 and S47. Be sure the rear cover of cabinet is securely closed, making door interlock S48, closed. You are now ready to try full power. Press "Filament On" switch button, wait for grid drive to be available on power amplifier. Press S42, "Reset" button to set up auxiliary relay K9, now press "High Power" switch S45. If things are right, the power amplifier plate current will rise to between 500 and 600 mA and you will have between 2500 and 2550 plate volts, indicated on the plate meter. The "Line Current" ammeter will be indicating around 4.2 to 4.4 amperes. Rotate your "Power Amplifier Tune" control slightly to see if you can raise the line current. Re-adjust your "PA Loading" control, watching your line current meter. You have arrived, if you approximate these readings.

Plate Current - 500 to 550 mA.

Plate Voltage - 2500 to 2550 volts.

Line Current - 4.45 amperes (into 50 ohm dummy).

4-31. Wich inductive tuning, maximum power output does not always occur at the minimum power amplifier plate current. Usually, one side of resonance provides greater output than the other side. De-tune 10 to 15 mA.

4-32. At this time, check the oepration of the fan at the top of the cabinet. It should be operating and exhausting the heated air out of the cabinet.

4-33. The modulator tubes should be drawing very little, or no plate current. (Remember, we adjusted the bias controls in their counterlcockwise positions, thus putting maximum bias on the modulators.)

4-34. MODULATOR ADJUSTMENT

4-35. At this time adjust the modulators. What is wanted is approximately 40 mA per tube, making a total of 80 mA. Be sure no audio signal is being fed into the transmitter. If your limiter is already connected, make sure its controls are in the OFF position.

4-36. Now place the modulator selector switch S1, located just below the modulator bias controls, to position "Mod. 1", then adjust the left modulator bias control until the modulator plate meter reads 40 mA. Place the modulator selector switch to "Mod. 2" position and adjust the right bias control to 40 mA. By setting this switch to "Total", a reading of 80 mA total for both tubes is indicated. This will be your operating position of the modulator selector switch for normal broadcasting. This feature allows you to check modulator tubes for balance and to reset them if they are out of balance. Slight touch-up of these controls often helps in final distortion readings. Actual perfect balance of static modulator currents is not mandatory. In some cases, one tube drawing slightly more static current than the other provides the best measurements. However, they should not be severely out of balance.

4-37. The plate rheostat R41, marked "Plate" on the inside cabinet support, provides about 200 volts variation for day to day power adjustments. Clockwise rotation increases the plate voltage. The filament rheostat, R43, located below the plate rheostat adjusts correct primary voltage to all the filament transformers.

4-38. MODULATION MONITOR CONNECTIONS

4-39. Terminals #13 and 14 on TB1A furnish rf drive for Modulation Monitor. Terminal #13 is ground, #14 is the "hot" lead. RF voltage is supplied by the positioning of a variable tap on the modulation monitor coil, L43, located in the top front of the transmitter, near the line rf ammeter.

4-40. METHOD OF ADJUSTMENT, COIL L43 AND RESISTOR R34. With the BC-1G Transmitter capable of operation at either 1000 or 250 watts, provision must be made to hold the output voltage of the modulation monitor excitation source constant at either power. The modulation monitor will then be in calibration and indicating percentage of modulation depth, regardless of output carrier power.

4-41. With the transmitter turned OFF, adjust the variable tap on coil, L43 to a position about midway on coil. Turn transmitter in (250W) low power. Adjust input tuning of modulation monitor for maximum indication of carrier meter. Note reading of carrier meter; if high, the tap on coil L43 must be relocated closer to ground end, if meter reads low, the tap must be relocated closer to the "hot" end of coil L43. The transmitter must be shut down, of course, for safety's sake, when changing taps.

4-42. With monitor output level from transmitter correct for modulation monitor calibration at 250 watt output level, place transmitter on high power, 1000 watts. Check reading on modulation monitor carrier meter. (Do not re-adjust modulation monitor input tuning). If reading is high or low, adjustment must be made by change of resistance of resistor, R34. Turn transmitter off. Adjust R34 variable tap as follows - If carrier meter reads high, it will be necessary to decrease the resistance of R34 until the carrier meter is indicating correctly (100 on scale). Conversely, if meter reads to low, more resistance must be added in R34 until carrier meter reads correctly. Now operate the transmitter at 250 watt level. Modulation Monitor carrier level meter should indicate calibration. If adjustments are so made, the carrier meter should be "on calibration" (read 100) for either 250 watt or 1000 watt operation.

4-43. If the customers modulation monitor drive requirements are such that the semi-variable 150 ohm resistor, R34, must be adjusted to 50 ohms, or less, in the shunt circuit, it (R34) must be replaced by one having a total overall resistance of 50 ohms. A 50 ohm, 50 watt semi-variable resistor has been supplied with the transmitter, for this purpose. This resistor change will be necessary for users of the HARRIS M-2639 Modulation Monitor.

4-44. TUNING PROCEDURE, 250 WATT CARRIER

4-45. Assume that the BC-1G Transmitter has been operating satisfactorily at 1000 watts power output. The adjustments and operational procedure to place the BC-1H on 250 watts is as follows -

a. Depress the "Plate Off" switch S43. This de-energizes the auxiliary plate relay K9, causing its holding contacts to open, also opening the 230 volt ac circuit to coil of high power plate contactor K2. Contactor K2 opens, removing primary voltage from transformer T40.

b. Now press the "Reset" switch S42. This again energizes the coil of auxiliary relay K9. This relay locks itself in and makes control voltage again available to high and low power contactors. Now depress "Low Power" pushbutton switch S44. This energizes the coil circuit of "Low Power" contactor K3, causing it to lock in. This action connects 115 volts into the priamary of the high voltage plate transformer T40. The transmitter is now developing 250 watts carrier. When contactor K3 energizes, various other connections were completed to fulfill the 250 watt circuit requirements. The operation of contactor K3, has been previously described in this technical manual.

4-46. There will be approximately 2.2 amperes shown on the rf line meter. The modulator will be energized. The plate current to the power amplifier will approximate 260/280 mA at a plate voltage of 1250 volts. The modulator plate current will be around 25 mA per tube (total of 50 mA). If the modulator plate currents do not read this, adjust tap on bias resistor R13, until they do.

4-47. DO NOT ADJUST the bias controls R1 and R2, if the modulator static plate current of each modulator is not approximately 25 mA, adjust tap on the bias resistor R13, until this condition is obtained.

NOTE

We have previously adjusted the bias potentiometer R1 and R2, to give the correct static plate currents at the 1000 watt carrier level and we desire this to remain so. By increasing the total resistance in resistor combination of R11 and R13, the bias voltage across the output bleeder resistors R1, R2 and R3, will decrease, this reduces the modulator bias causing the modulator static plate current to rise; by decreasing the total resistance of R11 and R13, the voltage across the R1, R2, R3 bleeder will increase; thus, increasing the modulator bias, this causes the modulator static plate current to decrease. (It will be noted that after the resistance value of R13 is determined and tap is secured on the resistor, then any re-adjustment of R1 and R2, the modulator bias potentiometers, will affect the static modulator plate currents at both the 1000 watt and 250 watt carrier level). By slight re-adjustment of these two controls, if necessary, satisfactory modulator operation will be assured at the two output powers.

4-48. TUNING PROCEDURE, M5422 OSCILLATOR

4-49. The following tuning instructions should be followed when placing the M5422 oscillator in operation. If this procedure is not followed, it is possible to tune the oscillator to the second harmonic of the crystal rather than the fundamental.

4-50. Information that follows was obtained with the M5422 oscillator connected to its proper rf load and 30 feet of RG62/U cable connected to the monitor terminal #6 with shield to ground, or terminal #7. RG62/U cable runs 13.5 mmfd. per foot, or a total of approximately 400 mmfd. effective capacity on the 30 foot lengths. Shorter lengths of cable on frequencies above 600 Kc will effect the tuning of the unit. More tuning capacity (C9) or more turns of the slug in L3 may be required for resonance.

4-51. Shorter lengths of monitor cable of frequencies from 600 Kc to 540 Kc may prevent the unit from tuning to resonance. If this is the case, capacity should be added across the cable to make up the difference in effective capacity. Longer lengths of cable would mean less capacity or less inductance needed for resonance in this frequency range. It is recommended that the proper length of RG62/U be used whenever possible.

Frequencies from 1600 kHz to 800 kHz.

a. NO PADDING needed in this frequency range.

b. Make sure that slug of L3 is screwed all the way out.

4-52. From 1600 kHz to approximately 1100 kHz, tune C9 for dip in plate current of peak in grid current of following stage. If C9 does not tune through resonance, screw in slug on L3 a turn at a time, until resonance is obtained with C9. 800 kHz is tuned with C9 near maximum capacity and slug of L3 screwed in 7 turns.

4-53. If above procedure is not followed, it will be possible for crystals from approximately 900 kHz to 800 kHz to tune to their second harmonic, if slug in L3 has not been screwed down to approximatley 7 turns for 800 kHz.

Frequencies from 540 kHz to 800 kHz.

a. The padder capacitor C11, 100 pF located on bottom of L3 must be connected in the circuit.

b. The slug of L3 should be screwed down 14 turns.

4-54. Frequencies from 540 kHz to approximately 600 kHz can be resonated with capacior C9. If complete resonance cannot be obtained on C9, screw the slug of L3 back out a turn at a time until resonance is obtained by turning C9. AT 800 kHz resonance will be with C9 near minimum capacity and the slug of L3 screwed out approximately 7 turns from the stating point, 14 turns down.

CAUTION

IF ABOVE PROCEDURE IS NOT FOLLOWED AND PADDER NOT CONNECTED, IT WILL BE POSSIBLE TO TUNE CRYSTALS FROM 540 KHZ TO 800 KHZ TO THEIR SECOND HARMONIC.

4-55. After resonance has been obtained, the crystal may be set to exact frequency by using the frequency monitor. Set the slots of the trimmer capacitors, C1 and C2, located on the front of the unit, at right angles to the plane of the trimmer mounting screws. With the crystal selector switch turned to #1 crystal, the frequency should be very close to zero; if not, adjust the trimmer FREQ. #1 until frequency is zero or to point desired for operation. Turn crystal selector switch to #2 position and repeat above operation with trimmer FREQ. #2.

4-56. The tuning of these condensers will not effect the resonant tuning of the unit and capacitor C9 will have very little, if any, effect on the trimmer adjustments.

SECTION V

MAINTENANCE

5-1. GENERAL

5-2. This section will contain information that should help the operating personnel keep this transmitter running correctly and reliably in its day-in and day-out broadcast service.

5-3. FREQUENCY ADJUSTMENT

5-4. The BC-1G Transmitter makes use of vacuum, mounted-in-glass ovenless crystals for the control of the operating frequency.

5-5. These crystals are capable of holding the transmitter frequency within a range of plus or minus 10 Hz (or better) over the standard broadcast band. There are no crystal air gaps to adjust, no thermostats to bother with, etc. The only adjustment that may have to be made is the one that allows for "Zeroing-in" of the crystal frequency. If the crystal frequency is off a few Hz it can be brought back to zero deviation by the slight adjustment of the variable capacitors marked "Freq. 1" and Freq. 2" on the M5422 oscillator unit. These controls will allow about a plus or minus 30 Hz change at 1600 kHz and a plus or minus 10 Hz change at 540 kHz.

5-6. If the crystal adjustments are being made at a new station there will be no accurate way of setting the frequency to exactly "zero". The station could go on the air for tests, with the assurance that the operating frequency will be somewhere within the range of the "Frequency Adjust" controls, as mentioned above.

5-7. The external frequency monitoring service can advise the frequency deviation, the engineer at the station can adjust one crystal to "zero". After the transmitter crystal has been so adjusted, it would be well to adjust the station's frequency monitor to coincide with the transmitter frequency. (The frequency monitor should have been heating for a sufficient length of time to stabilize.)

5-8. Once the station's frequency monitor has been calibrated and is working satisfactorily, the station engineer has a reliable source of frequency measurement and can, from this point, go ahead and adjust the second crystal, using the station frequency monitor as a standard.

5-9. For the station that has been on the air and has a calibrated frequency monitor in operation, the station engineer can simply make the transmitter crystal adjustment while observing the results on the frequency monitor.

5-10. TRANSMITTER CLEANLINESS

5-11. Keeping the transmitter equipment clean cannot be over-emphasized. Dirt, grime, dust, causes more outages than nearly any other cause.

5-12. Air filters should be replaced whenever necessary. The length of use depends, of course, on the individual transmitter location. Replace filters when inspection shows they are getting dirty and are not doing the job intended.

5-13. RELAY MAINTENANCE

5-14. Relay maintenance should be a regular operation. Keep relays clean, free from dust and dirt. Contacts should be checked for pitting. The use of a burnishing tool to keep contacts in shape preferred. If such a tool is not available, a very light grade of sandpaper can be used, but used sparingly.

5-15. CARE OF PRINTED WIRING BOARDS

5-16. Printed wiring boards are used in the BC-1G Transmitter in four separate locations, in the M5422 oscillator unit, in the 807 rf driver board, in the audio input/audio driver board and the feedback ladder board. For protection, these boards have been treated with a silicon varnish. Use a soft bristled brush to remove dust, nothing else.

5-17. CABINET VENTILATING FAN

5-18. The transmitter makes use of a top-of-cabinet ventilating fan, to provide adequate ventilation. Keep the fan blades clean, free from dust and dirt. Clean blades will remove more air. The fan requires no lubrication.

5-19. TEST EQUIPMENT

5-20. A broadcast station should own, as a minimum requirement, a good volt-ohmmeter and an oscilloscope. Annually all broadcasters must take Proof-of-Performance measurements, for top flight performance monthly tests are recommended. The SA-131 Proof of Performance set is available, the use of which will help the operating personnel keep the transmitter working at its very best all of the time.

5-21. DC RESISTANCE MEASUREMENTS MODULATION TRANSFORMER AM-30469E

5-22. These measurements were made using a Model #260 Simpson Volt-ohmmeter, an average value of several transformers.

Primary, between Terminals #1 and #2 --- 55 ohms.
Primary, between Terminals #1 and #3 --- 76 ohms.
Primary, between Terminals #2 and #3 --- 40 ohms.

Secondary, between Terminals #5 & #5 - 89 ohms.

Tertiary Winding, between Terminals #6 & #7 -- 3.8 ohms.
Tertiary Winding, between Terminals #6 & #8 -- 5.4 ohms.
Tertiary Winding, between Terminals #6 & #9 -- 7.3 ohms.

SECTION VI

PARTS LIST

6-1. INTRODUCTION

6-2. This section contains the parts list for the BC-1G 1000/250 WATT BROADCAST TRANSMITTER.

Table 6-1. Parts List

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C1,C2	520 0116 000	Capacitor, Variable, 3.9-50 pF	2
C3	502 0147 000	Capacitor, 24 pF, 500(W) V	1
C4	502 0094 000	Capacitor, 800 pF, 500 (W) V	1
C5	506 0010 000	Capacitor, .01 uF, 400V	1
C6	502 0163 000	Capacitor, 100 pF, 500 (W) V	1
C7,C8	516 0082 000	Capacitor, .01 uF, 1000V	2
C9	520 0119 000	Capacitor, Variable 6.7-140 pF	1
C10	502 0163 000	Capacitor, 100 pF, 500 (W) V	1
C11	502 0163 000	Capacitor, 100 pF, 500 (W) V	1
C12	500 0815 000	Capacitor, 39 pF, 500 (W) V	1
J1	610 0047 000	Receptacle	1
L1,L2	494 0033 000	RF Choke, 2.5 mH	2
L3	492 0019 000	Variable Coil, 105-200 uH	1
R1	540 0764 000	Resistor, 100k ohm, 2W, 10%	1
R2,R3	540 0740 000	Resistor, 1000 ohm, 2W, 10%	2
R4	540 0754 000	Resistor, 15k ohm, 2W, 10%	1
R5	540 0752 000	Resistor, 10k ohm, 2W, 10%	1
R6	540 0764 000	Resistor, 100k ohm, 2W, 10%	1
R7	540 0730 000	Resistor, 150 ohm, 2W, 10%	1
R8	540 0752 000	Resistor, 10k ohm, 2W, 10%	1
R9,R10,R11	540 0757 000	Resistor, 27k ohm, 2W, 10%	3
R14	540 0284 000	Resistor, 10 ohm, 1W, 5%	1

Table 6-1. Parts List (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
S1	913 0316 001	Rotary Switch	1
V1,V2	370 0123 000	Tube, 12BY7A	2
XV1,XV2	404 0059 000	Socket, Noval	2
XY1,XY2	404 0016 000	Socket, Crystal	2
Y1,Y2		Vacuum Crystal (Det by Freq.)	2

Table 6-2. Feedback Ladder Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C1,C2	500 0666 000	Capacitor, .002 uF, 1200 (W) V	2
C3 thru C10	500 0659 000	Capacitor, .0001 uF, 1200 (W) V	8
R1 thru R8	540 0657 000	Resistor, 82k ohm, 2W, 5%	8
R9,R10	540 0691 000	Resistor, 2.2 Megohm, 2W, 5%	2

Table 6-3. 1 kW Dummy Antenna

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
R1 thru R6	546 0216 000	Resistor, 312 ohms, 200W, non-inductive	6

WARNING: Disconnect primary power prior to servicing

Table 6-4. RF Driver Printed Wiring Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C1 thru C8	516 0082 000	Capacitor, .01 uF, 1000 (W) V	8
L1	494 0033 000	Choke, 2.5 mH	1
L2,L3	913 0520 001	Parasitic Suppressor	2
R2	542 0197 000	Resistor, 35k ohm, 25W	1
R3,R4,R5	540 0271 000	Resistor, 3 ohm, 1W, 5%	3
R6	540 0724 000	Resistor, 47 ohm, 2W, 10% (Used On L2 and L3)	1
R7	540 0724 000	Resistor, 47 ohm, 2W, 10%	1
R8	540 0724 000	Resistor, 47 ohm, 2W, 10% (Used On L2 and L3)	1
R9	540 0724 000	Resistor, 47 ohm, 2W, 10%	1
R10	542 0147 000	Resistor, 47 ohm, 2W, 10%	1
R11,R12	540 0291 000	Resistor, 20 ohm, 1W, 5%	2
V1,V2	374 0030 000	Tube, 807	2
XV1,XV2	404 0012 000	Socket	2

Table 6-5. Audio Input and Driver Printed Wiring Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C1,C2	502 0174 000	Capacitor, .0027 uF	2
C3	522 0219 000	Capacitor, 4 uF, 450V	1
C4,C5	508 0265 000	Capacitor, .027 uF, 600V	2
C6,C7	522 0129 000	Capacitor, 4 uF, 450V	2
C8	516 0082 000	Capacitor, .01 uF, 1000 (W) V	1
C9,C10	500 0024 000	Capacitor, .0001 uF, 500V	2
L1,L2	913 0531 000	Parasitic Suppressor	2
R1,R2	540 0758 000	Resistor, 33k ohm, 2W, 10%	2
R3	552 0545 000	Control, 1000 ohm, wire-wound #1 Taper, Style 2 Shaft	1
R4	540 0763 000	Resistor, 82k ohm, 2W, 10%	1
R5	540 0765 000	Resistor, 120k ohm, 2W, 10%	1
R6,R7	540 0764 000	Resistor, 100k ohm, 2W, 10%	2
R8,R9	540 0772 000	Resistor, 470k ohm, 2W, 10%	1
R10	540 0752 000	Resistor, 10k ohm, 2W, 10%	1
R11,R12	542 0095 000	Resistor, 10k ohm, 10W	1
R13 thru R16	540 0760 000	Resistor, 47k ohm, 2W, 10%	4
R17,R18	540 0724 000	Resistor, 47 ohm, 2W, 10%	2
R19,R20	540 0291 000	Resistor, 20 ohm, 1W, 5%	2
R21	540 0751 000	Resistor, 8200 ohm, 2W, 10%	1
R22,R23	540 0724 000	Resistor, 47 ohm, 2W, 10% (Part of L1 and L2)	2
R24,R25	540 0766 000	Resistor, 150k ohm, 2W, 10%	2

Table 6-5. Audio Input and Driver Printed Wiring Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
V1 thru V4	374 0030 000	Tube, 807	4
XV1 thru XV4	404 0012 000	Socket, MIP-5T	4

Table 6-6. Panel and Shelf Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
AT1	913 5998 001	"H" Pad Assembly, Audio Input	1
C1	510 0497 000	Capacitor, 1 uF, 1 kV (Audio Decoupling)	1
C2	500 0452 000	Capacitor, .002 uF, 1200 (W) V (807 Blocking)	1
C3	510 0345 000	Capacitor, 4 uF, 600V. (Audio Decoupling & Bias Filter)	1
C4	520 0068 000	Capacitor (807 Tank Tune)	1
C5,C6	500 0653 000	Capacitor, .01 uF, 600V (PA Filament By pass) Part of 937 7708 001 socket)	2
C7 thru C11	516 0082 000	Capacitor, .01 uF, 1 kV (PA Bias Bypass)	5
C12	510 0345 000	Capacitor, .4 uF, 600V (Audio Decoupling & Bias Filter)	1
C13		Capacitor 807 Tank Padder (Det. By Freq.)	
CR1	384 0094 000	Rectifier, Silicon	1
E1	398 0301 000	Carbon Block	1
F1,F2	398 0184 000	Fuse, Primary, 20 amp, 250V	2
F3	398 0011 000	Fuse, Bias Primary, 1/4 amp 250V	1
F4	398 0019 000	Fuse, Int. Voltage, 2 Amp, 250V	1
K1	570 0162 000	Contactor, Fil. & Plt. 4 pole, N.O. 25 amp, 230V 50/60 cy.	1
K2	570 0163 000	Contactor, Hi Power	1
K3	570 0111 000	Contactor, Low Power	1

Table 6-6. Panel and Shelf Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
K4	574 0014 000	Relay, 625. Supply, O.L. & P.A. O.L. 6V dc coil	1
K5	574 0066 000	Relay, Low Voltage, lockout & P.A. Auxiliary DPDT, 230 Vac coil	1
K6	572 0081 000	Relay, Mod. O.L.	1
K7	574 0014 000	Relay, 625. Supply, O.L. & P.A. O.L. 6V dc coil	1
K8	576 0019 000	Relay, Time Delay (use w/Sil. Rect.)	1
K8	576 0022 000	Relay, Time Delay (use w/Tube Rect.)	1
L1,L2	476 0009 000	Choke, Bias & Isolation, 10 Hy	2
L3	913 0518 001	Coil, 807 RF 2nd IPA	1
L4	927 5284 001	Assembly Plate Coil, 807 Tank	1
(L48,L49)	913 0910 001	PA Parasitic Suppressor Assy	2
P1	612 0099 000	Plug	1
R1,R2	552 0255 000	Potentiometer, Mod. Bias, 10k ohms, 4W	2
R3	542 0083 000	Resistor, Bias, 2500 ohms, 10W	1
R4	542 0180 000	Resistor, Aud. Dropping, 1000 ohm, 25W	1
R5	542 0194 000	Resistor, Osc. Dropping, 20k ohm 25W	1
R6	542 0089 000	Resistor, for K8 Heater, 6000 ohm, 10W	1
R7	550 0067 000	Potentiometer, AC Volt & PA Volt. Rmt. Ind. 10k ohm, 2W	1

Table 6-6. Panel and Shelf Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
R9,R10	552 0008 000	Resistor, Adj. K4, K6 & K7 shunt, 20 ohm, 10W	2
R11	542 0088 000	Resistor, Series Bias, 5000 ohm, 10W	1
R12	552 0109 000	Resistor, Adj. 807 Bias, 40k ohm, 50W	1
R13	552 0104 000	Resistor, Adj. Mod. Bias Set, 12k ohm, 50W	1
R14	550 0238 000	Potentiometer, Aud. Pad Shunt, 250 ohm	1
R15,R16	542 0219 000	Resistor, PA Grid, 5000 ohm, 50W	2
R17,R18,R19	540 0271 000	Resistor, 3 ohm, 1W, 5%	3
R20 thru R25	544 1367 000	Resistor, 500k ohm, 2W, 1%	6
R28	550 0067 000	Potentiometer, AC Volt & PA Volt. Rmt. Ind. 10k ohm, 2W	1
R29	542 0056 000	Resistor, 20 ohm, 10W	1
R30	542 0057 000	Resistor, 25 ohm, 10W	1
R31	550 0055 000	Potentiometer, PA Current, 100 ohm, 2W	1
R32,R33	542 0053 000	Resistor, 7.5 ohm, 10W	2
R34	552 0088 000	Resistor, Adj. Mod. Mon. Adjust 150 ohm, 50W	1
R35,R36,R37	540 0066 000	Resistor, 5100 ohm, 1/2W, 5%	3
S1	602 0005 000	Switch, Lever, Mod. Selector	1
S2	914 9395 001	Switch, Rotary, Multimeter (Mod.)	1
T1	472 0453 000	Transformer, Bias Power	1

Table 6-6. Panel and Shelf Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
T2	478 0142 000	Transformer, Audio Input	1
T3	472 0452 000	Transformer, Multi-Filament	1
TB1,TB1A,TB2	614 0123 000	Terminal board	5
V40 thru V43	374 0039 000	Tube, 833A, PA & Mod.	4
XF1,XF2	931 8443 001	Fuse Block 3 pole, 2/solid neutral	2
XF3,XF4	402 0021 000	Fuseholder	2
XK8	404 0016 000	Socket	1
XV40 thru XV43	937 7708 001	Socket Assembly, PA & Mod.	4
	913 5958 002	280V Silicon Rectifier Bias Supply	1

Table 6-7. PA Tuning and Output Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C40	992 1381 001	Capacitor, Neutralizing PA	1
C41	508 0150 000	Capacitor, PA Plate Blocking, .001 uF	1
C42,C43		Capacitor, PA Tank (Det. by Freq.)	2
C44,C45		Capacitor, Input and Output Loading (Det. by Freq.)	2
C46	504 0150 000	Capacitor, PA Plate Blocking, .001 uF	1
L40	931 6583 010	Coil, Variable, PA Tank	1
L41	931 6138 047	Coil, Fixed, Input Loading	1
L43	938 0503 001	Coil, Mod. Monitor Pickup	1
L44	926 7569 001	Choke, PA RF	1
M44	634 0081 000	Meter, RF Line Current, 0-8A RF Int. Thermo Sq. Law Scale	1
TB41	614 0092 000	Terminal Board	

Table 6-8. Transmitter Assembly

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
B40	991 2676 001	Fan Assembly	1
C47	510 0501 000	Capacitor, Int. Volt Supply, 10 uF, 1 kV	1
C48	510 0510 000	Capacitor, High Voltage, 3 uF, 3 kV	1
C49	510 0686 000	Capacitor, Audio Coupling, 2 uF 3 kV	1
C50,C51	516 0397 000	Capacitor, Transient Supp. 2200 pF 10 kV	2
L45	476 0177 000	Reactor, Filter, High Voltage	1
L46	476 0244 000	Reactor, Filter, Int. Voltage	1
L47	476 0243 000	Reactor, Modulation	1
M40	632 0461 000	Multimeter, 0-1 MADC with 0-3000 MADC, 0-30 MADC Scale, also 10V ac indicator line.	1
M41	632 0462 000	Meter, Plate Voltage, 0-1 MADC with 0-3000V dc scale	1
M42,M43	532 0463 000	Meter, PA and Mod. Plate Current 0-1 Amp. DC	2
R40	914 3422 001	Multiplier, Meter, 3 megohm	1
R41	913 6019 001	Rheostat, High Voltage Plate Control, 400 ohm, 300W	1
R42	542 0312 000	Resistor, High Voltage Bleeder, 100k ohm, 100W	1
R43	552 0405 000	Rheostat, Fil. Primary, 15 ohm 150W	1
R44 thru R48	540 0202 000	Resistor, Neon Lamp Series, 100k ohm, 1/2W, 10%	5

Table 6-8. Transmitter Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
R49	911 0534 001	Multimeter Series Res. Assy.	1
R50,R51	540 0638 000	Resistor, Transient Supp. 13k ohm 2W	2
S40	604 0250 000	Switch, Toggle Local/Remote SPDT	1
S41	604 0245 000	Switch, Filament, Push On/Push off red button, with Neon Lamp, 45" leads, 6 amp.	1
S42	604 0246 000	Switch, Reset, N.O. momentary red button, with Neon Lamp 45" leads.	1
S43	604 0247 000	Switch, Plate Off, N.C. momentary white button, with Neon Lamp, 45" leads.	1
S44	604 0248 000	Switch, Low Power, N.O. Momentary amber button, with Neon Lamp, 45" leads.	1
S45	604 0249 000	Switch, High Power, N.O. momentary white button, with Neon Lamp, 45" leads.	1
S48	604 0380 000	Switch, Door Interlock, High and Low Voltage	1
T40	472 0624 000	Transformer, Power	1
T41	478 0084 000	Transformer, Modulation	1
T42	472 0454 000	Transformer, Plate, Int. Voltage	1
T43	472 0107 000	Transformer, 866A Filament	1
T44	472 0211 000	Transformer, 8008 Filament	1
TB42	614 0020 000	Terminal Board	1
V44,V45	374 0042 000	Tube, Rect. 866A (If used)	2

Table 6-8. Transmitter Assembly (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
V46,V47	374 0058 000	Tube, Tect. 8008 (If used)	2
XV44,XV45	404 0022 000	Socket (If used)	2
XV46,XV47	404 0121 000	Socket (If used)	2
	926 7689 002	625V Silicon Rectifier Int. Supply Board	1
	937 9607 002	2800V dc 1/2 Wave Silicon Rectifier Board	1

Table 6-9. 280V Bias Supply Board - 913 5958 002

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
	384 0019 000	Rectifier, IN2070	10
	540 0214 000	Resistor, 1 Megohm, 1/2W, 10%	10
	516 0054 000	Capcitor, Disc. 1kV, .001, 10%	10

Table 6-10. 625V Intermediate Supply Board and Components - 1kW Transmitter
926 7689 002

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
	384 0095 000	Diode, 600V PIV, 1 amp	14
	540 0214 000	Resistor, 1 Megohm, 1/2W, 10%	14
	516 0054 000	Capacitor, Disc. 1 kV, .001, 10%	14

Table 6-11. 2800 Vdc, 1/2 Wave Silicon Rectifier - 937 9607 002

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
	384 0095 000	Diode, 600V PIV, 1 amp	30
	540 0214 000	Resistor, 1 Megohm, 1/2W, 10%	30
	516 0054 000	Capacitor, Disc., 1 kV, .001, 10%	30

SECTION VII

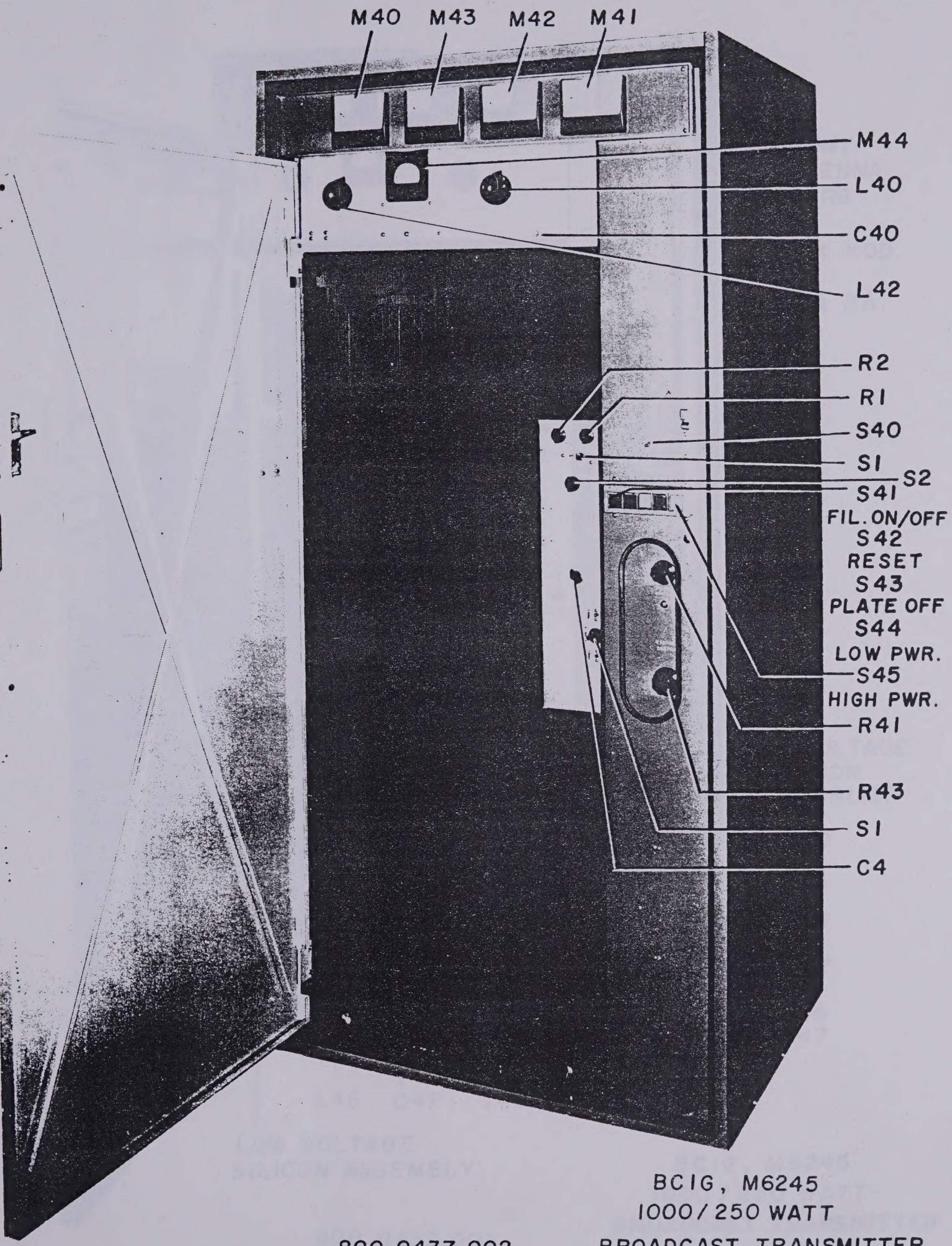
DIAGRAMS

7-1. INTRODUCTION

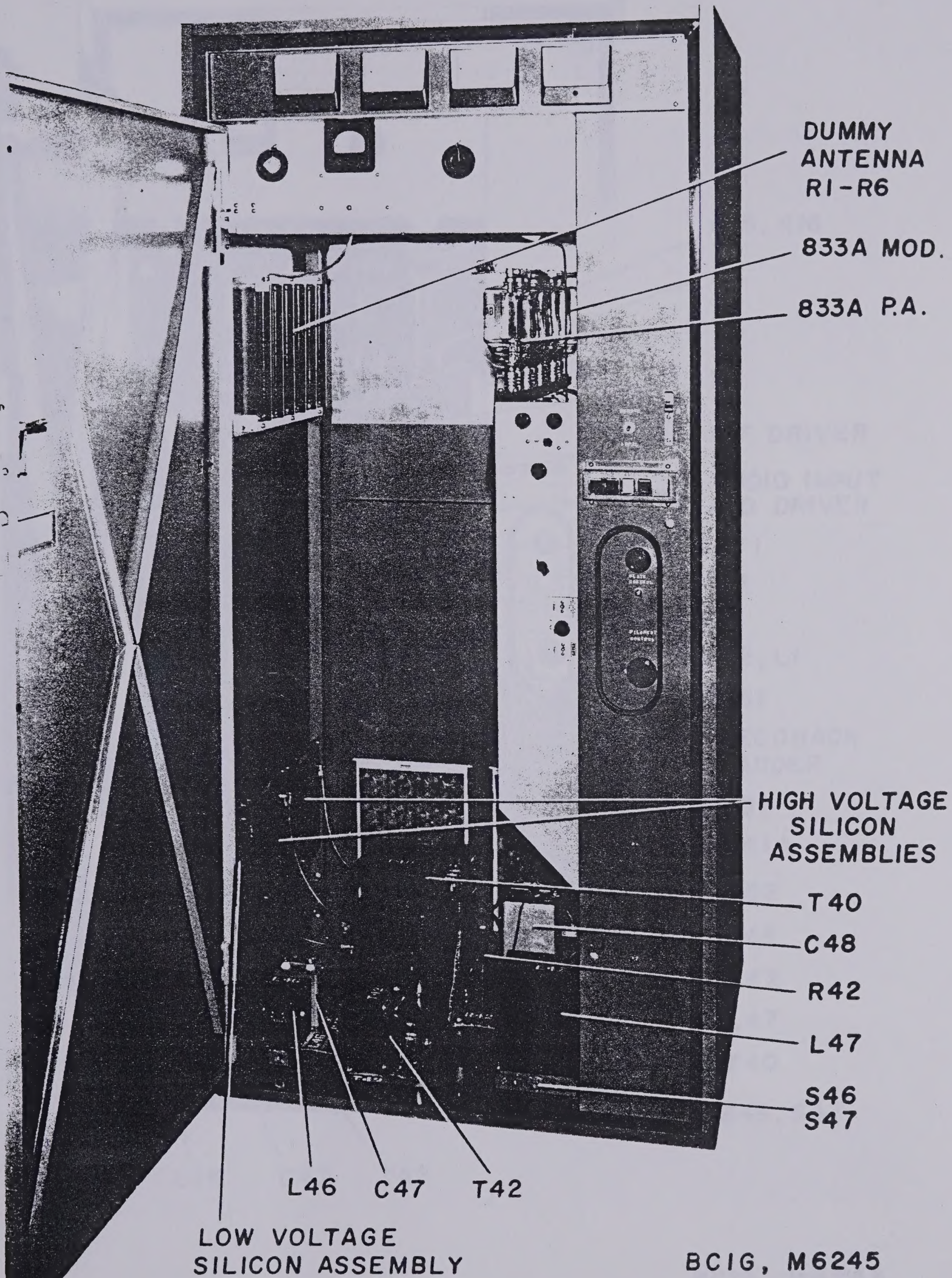
7-2. This section contains the photographs, diagrams and schematics necessary for maintaining the BC-1G AM BROADCAST TRANSMITTER. The following are contained in this section.

800 0437 002	Front Door Open, Screen in Place
800 0437 003	Front Door Open, Screen removed
800 0437 004	Front Door Open, Screen removed, Panel & Shelf
800 0437 005	Inside View, Top Portion, Transmitter
800 0437 006	Inside View, Bottom Portion, Transmitter
800 0437 007	Rear View, Back Removed, showing Rectifiers
800 0437 008	Rear View, Back Removed, showing Panel & Shelf
800 0437 009	Side View, Side Cover Off
A-30584	Typical Curves, Frequency Stability, Vacuum Crystal
821 3816 001	Schematic, Oscillator Unit, M5422
813 7774 001	Typical Voltage Chart
813 7711 001	Tuning Chart
813 7626 001	Wiring Diagram, Modulator Selector Switch
813 7928 001	Supplemental Relay Connections, K1A
813 7961 001	Supplemental Relay K1A Location
813 7914 001	Wiring Diagram, Remote Plate Voltage Control
813 8485 001	Wiring Diagram, Studio unit, RDC-10C
837 9369 001	Wiring Diagram, Transmitter Unit, RDC-10C

826 9003 001	Interconnections using RDC-10C Transmitter Unit
813 7963 001	Running Sheets, Panel & Shelf
813 7962 001	Running Sheets, Cabinet
826 8808 001	Control Circuitry
813 7924 001	Base Layout
813 7629 001	Diagram, Primary Relay K1
813 8885 001	Contact Identification
813 7628 001	Wiring Diagram, Multimeter S2 Connections
852 5878 001	Overall Schematic

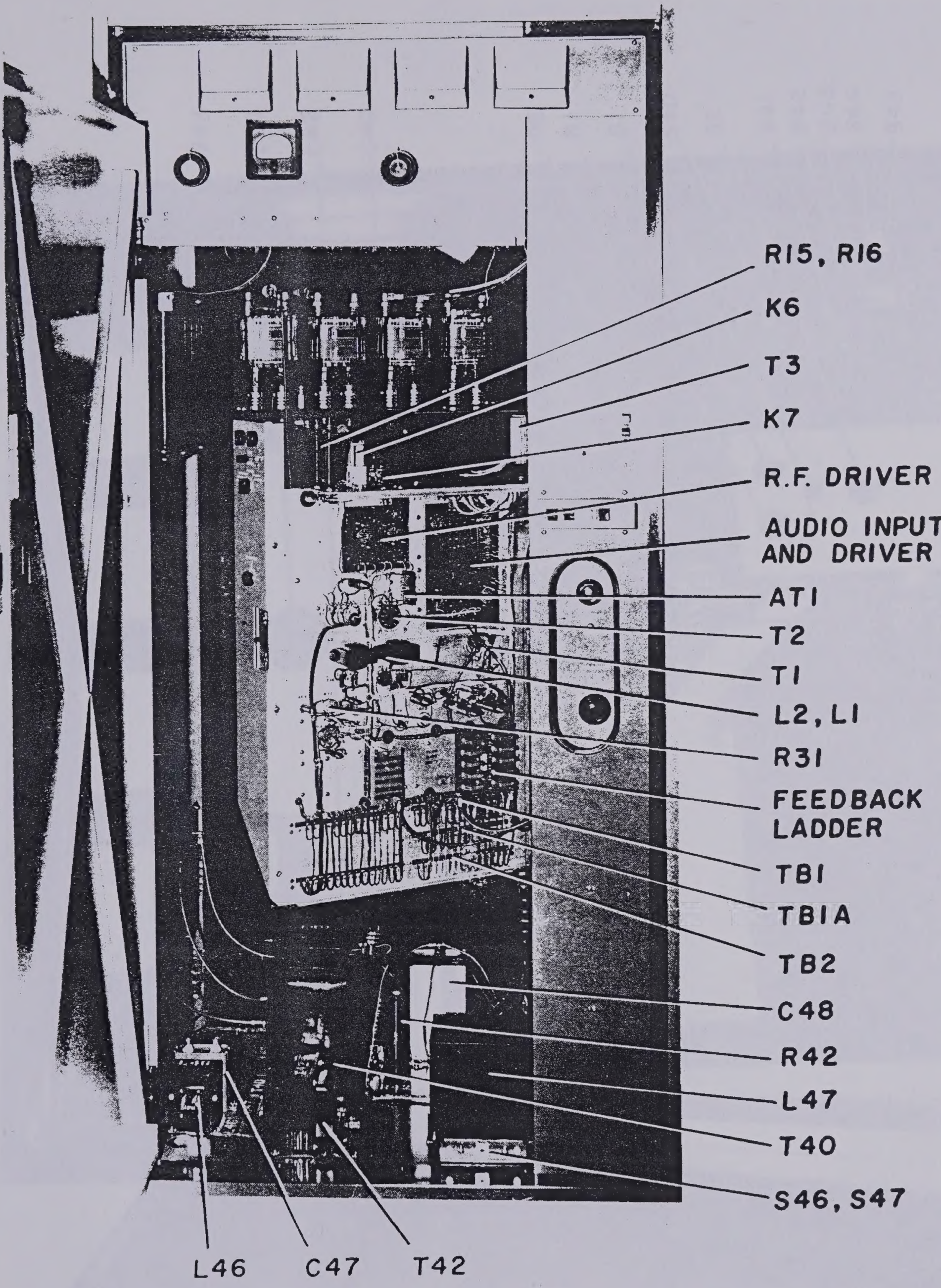

M40
M43
M42
M41
M44
L40
C40
L42
R2
R1
S40
S1
S2
S41
FIL. ON/OFF
S42
RESET
S43
PLATE OFF
S44
LOW PWR.
S45
HIGH PWR.
R41
R43
S1
C4

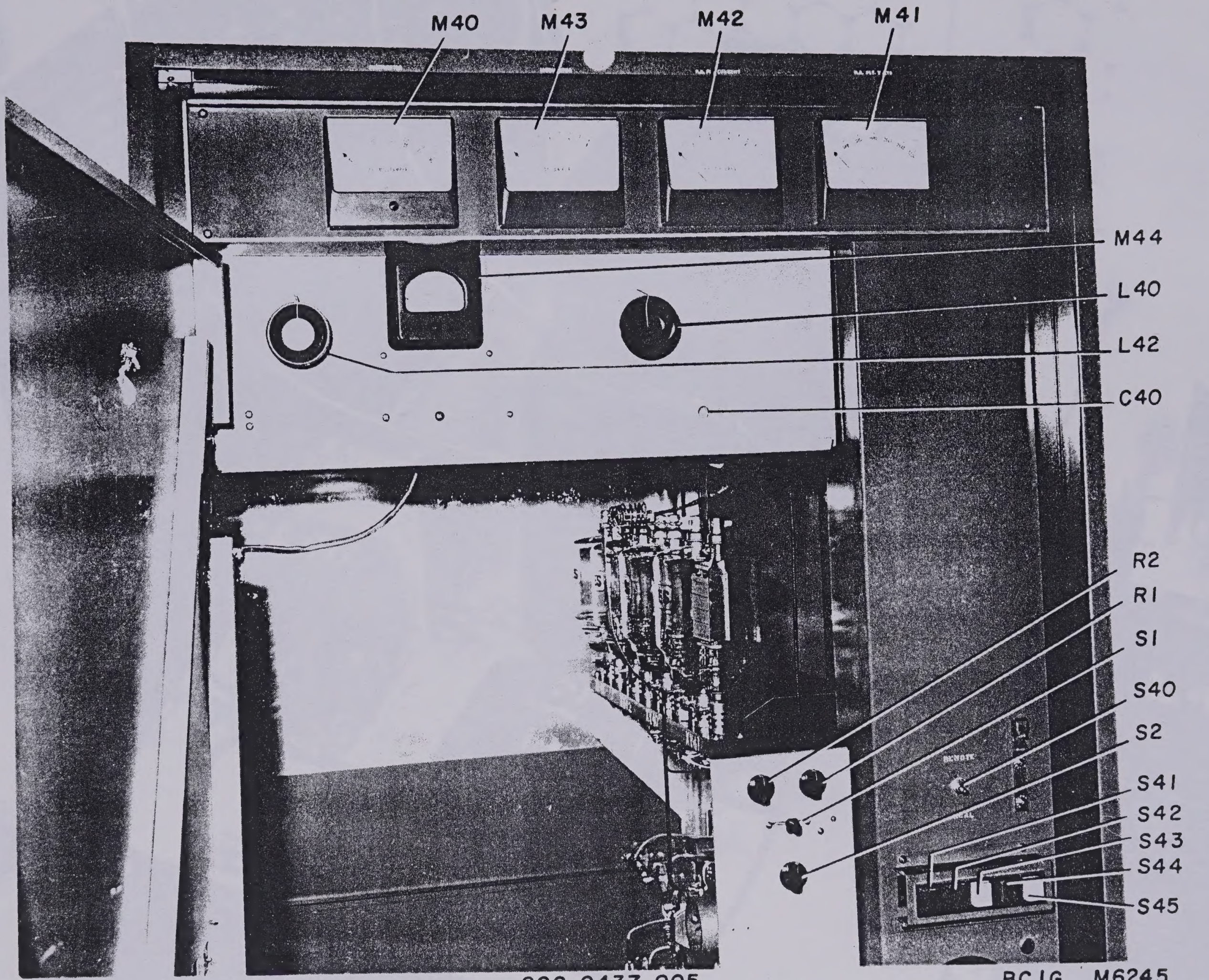
BCIG, M6245
1000/250 WATT
BROADCAST TRANSMITTER


DUMMY ANTENNA R1-R6
833A MOD.
833A P.A.
HIGH VOLTAGE SILICON ASSEMBLIES
T40
C48
R42
L47
S46
S47
L46
C47
T42
LOW VOLTAGE SILICON ASSEMBLY

BCIG, M6245
1000 / 250 WATT
BROADCAST TRANSMITTER

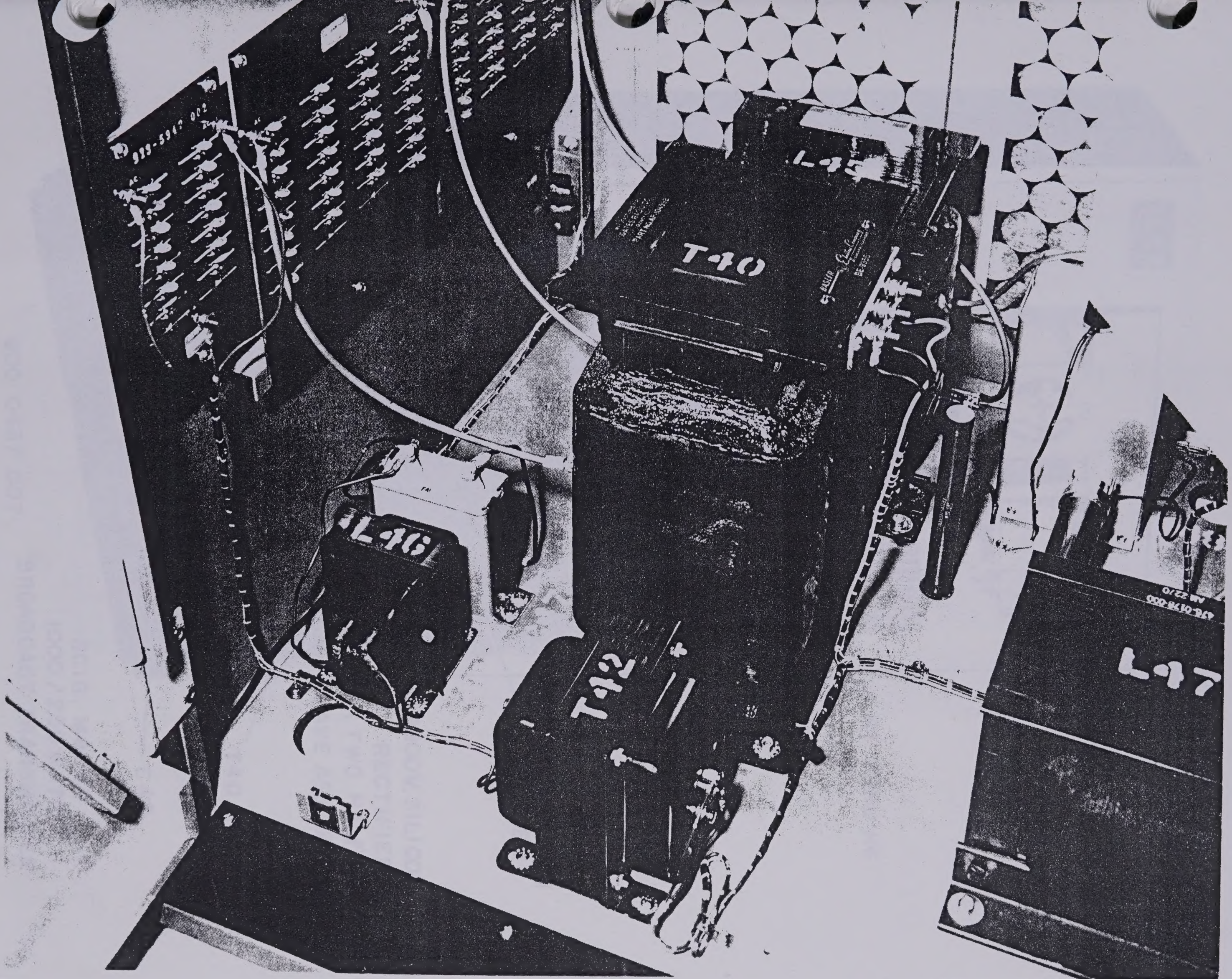
800 0437 003


R15, R16
K6
T3
K7
R.F. DRIVER
AUDIO INPUT AND DRIVER
AT1
T2
T1
L2, L1
R31
FEEDBACK LADDER
TB1
TB1A
TB2
C48
R42
L47
T40
S46, S47
L46
C47
T42


M40
M43
M42
M41
M44
L40
L42
C40
R2
R1
S1
S40
S2
S41
S42
S43
S44
S45

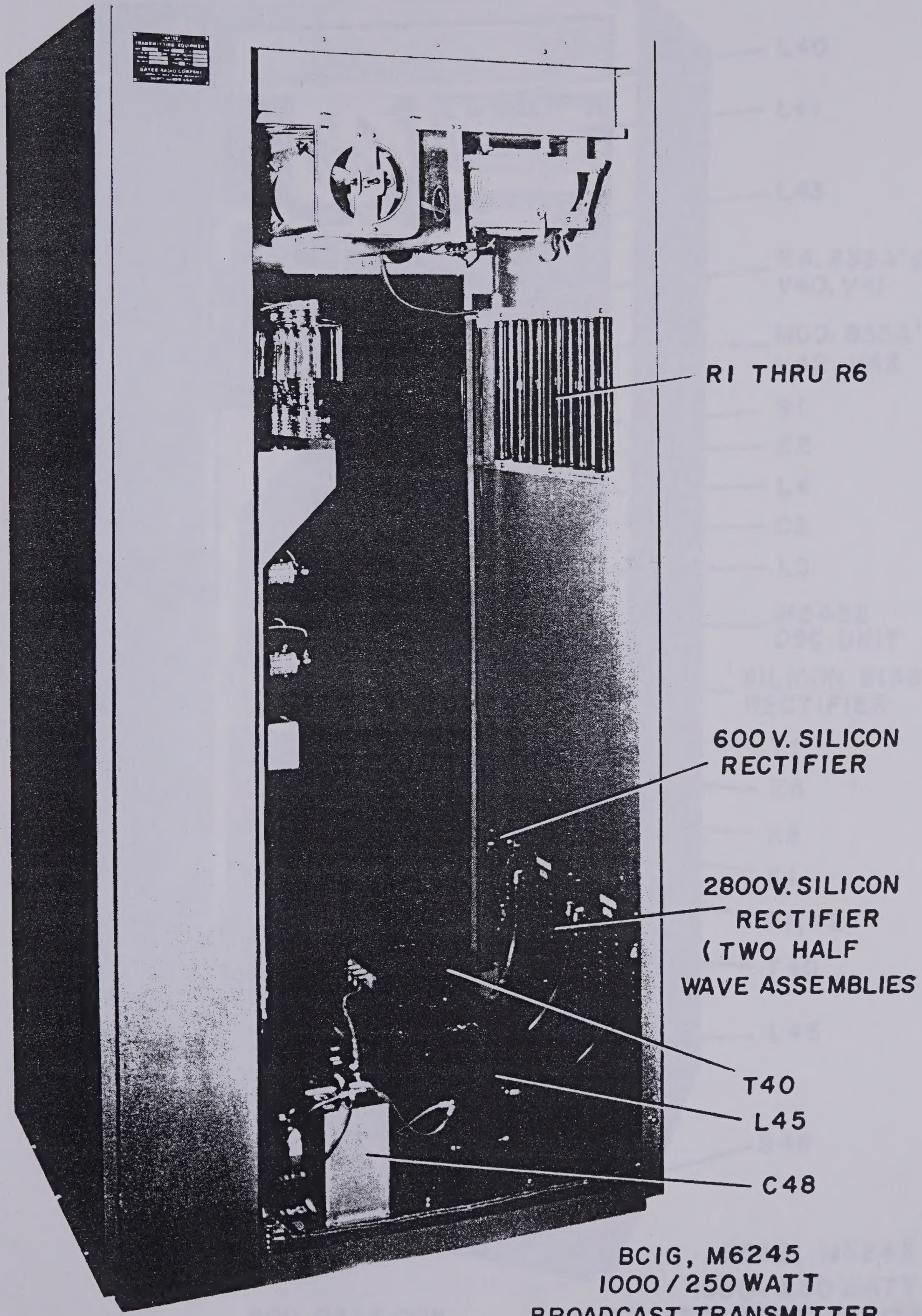
800 0437 005

BCIG, M6245

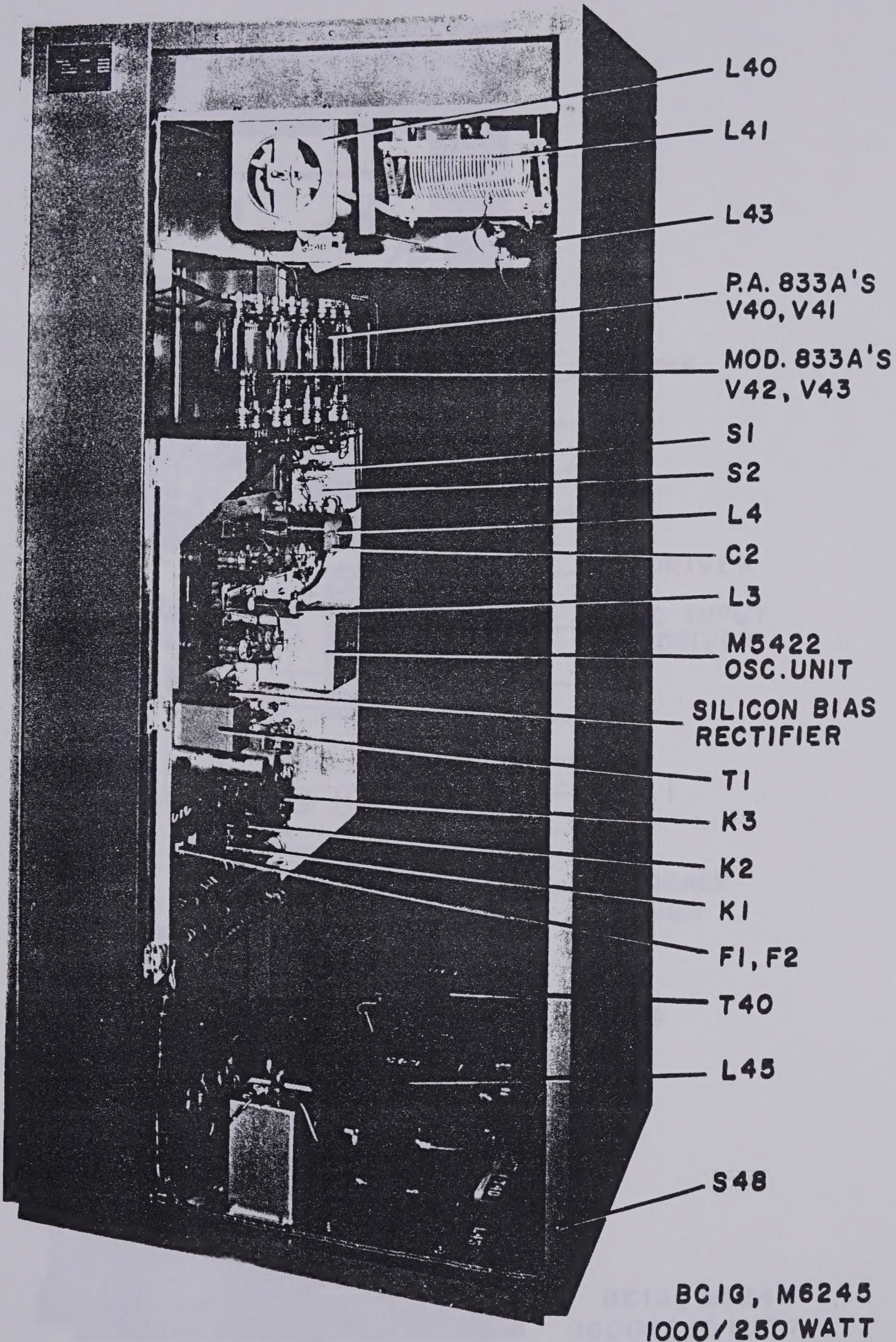

L45
T40
L46
T42
L47

800 0437 006

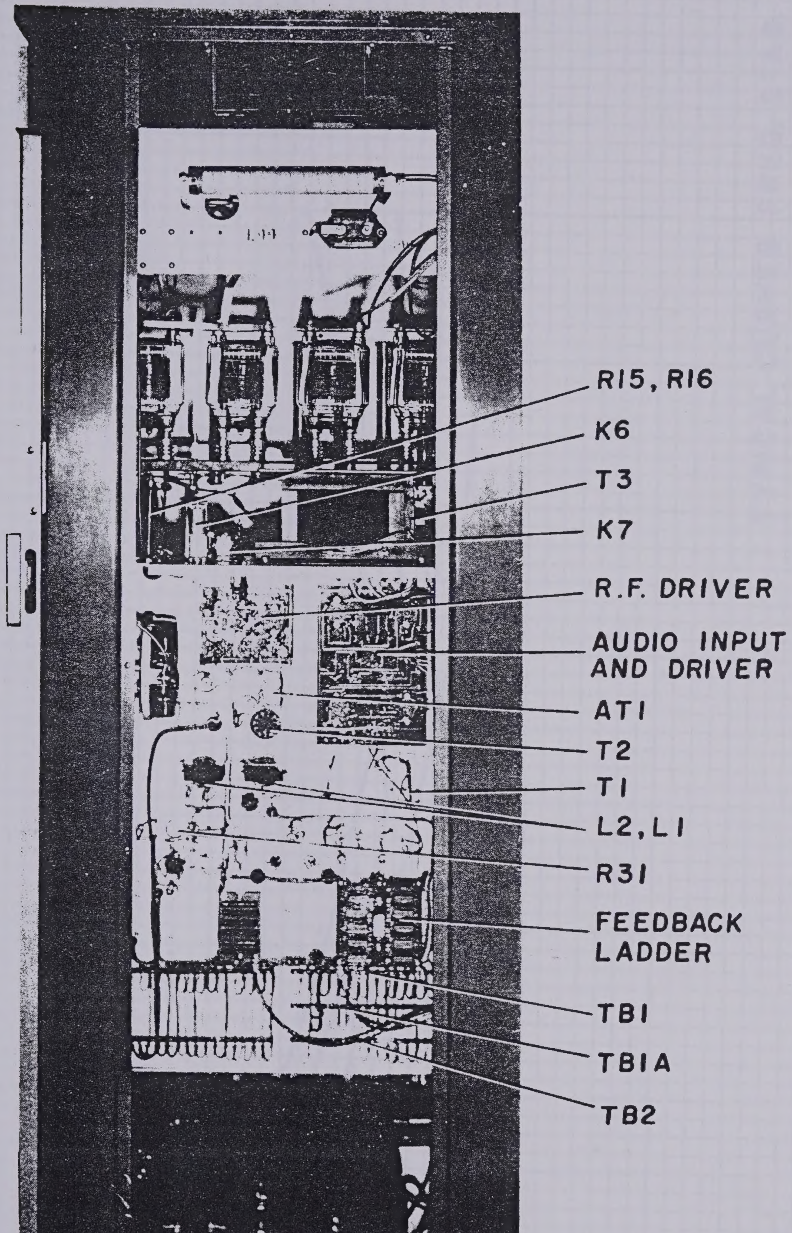
BCIG, M6245


R1 THRU R6
600 V. SILICON RECTIFIER
2800 V. SILICON RECTIFIER (TWO HALF WAVE ASSEMBLIES
T40
L45
C48

BC1G, M6245
1000 / 250 WATT
BROADCAST TRANSMITTER

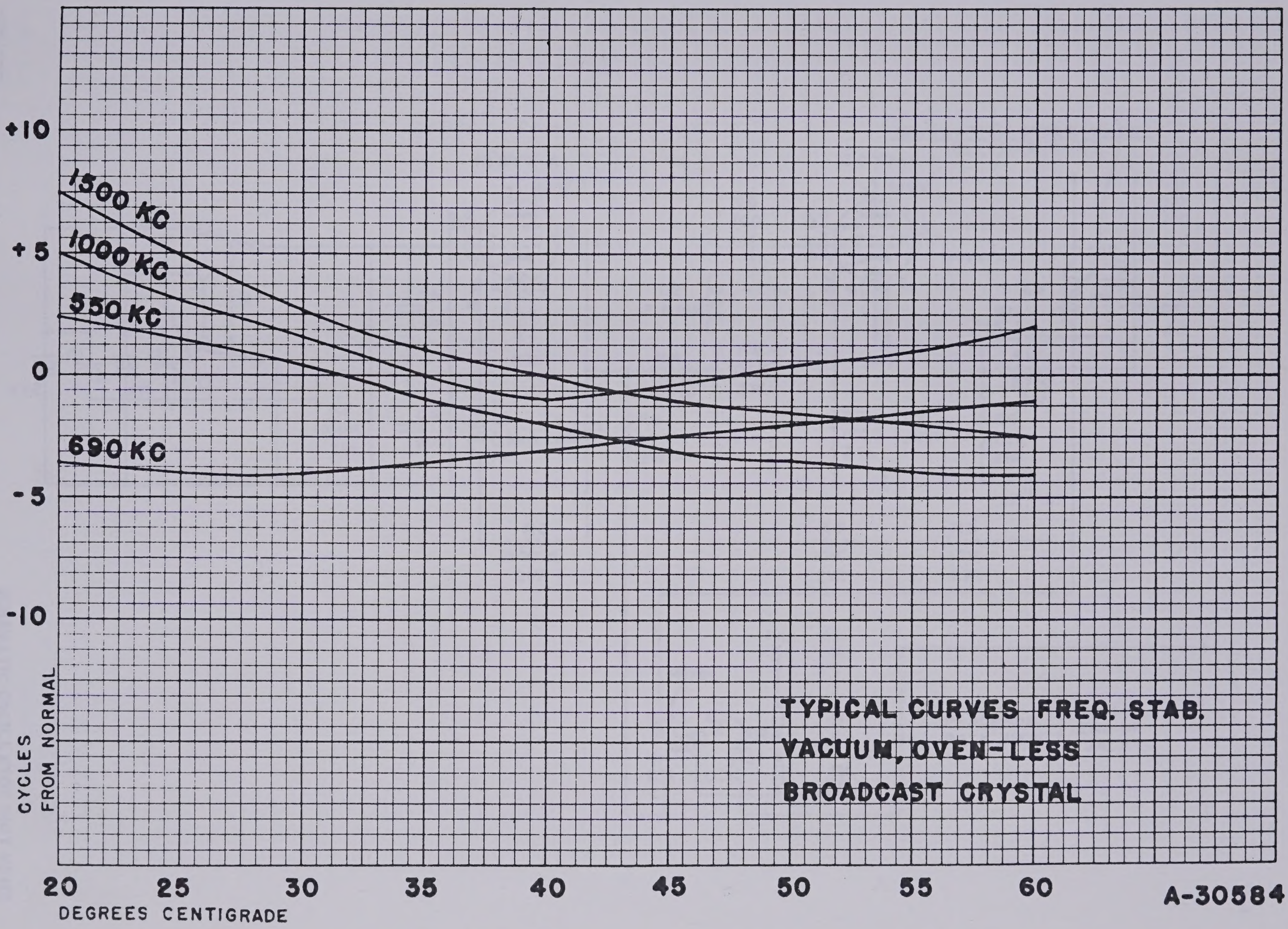

L40
L41
L43
P.A. 833A'S
V40, V41
MOD. 833A'S
V42, V43
S1
S2
L4
C2
L3
M5422
OSC. UNIT
SILICON BIAS
RECTIFIER
T1
K3
K2
K1
F1, F2
T40
L45
S48

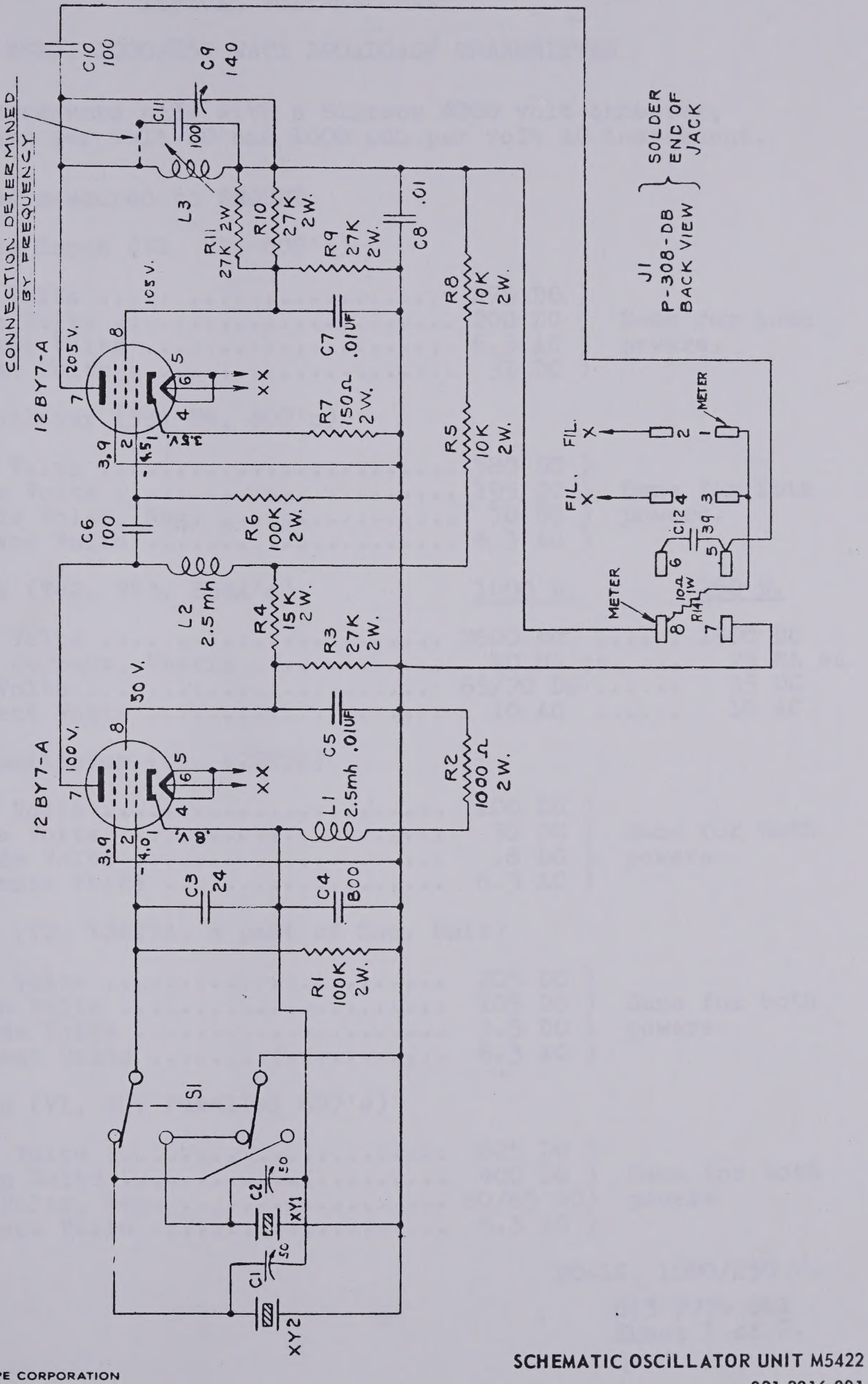
BC1G, M6245
1000/250 WATT
BROADCAST TRANSMITTER


R15, R16
K6
T3
K7
R.F. DRIVER
AUDIO INPUT AND DRIVER
AT1
T2
T1
L2, L1
R31
FEEDBACK LADDER
TB1
TB1A
TB2

BCIG, M6245
1000/250 WATT
BROADCAST TRANSMITTER

A-30584


TYPICAL CURVES FREQ. STAB.
VACUUM, OVEN-LESS
BROADCAST CRYSTAL
1500 KC
1000 KC
550 KC
690 KC
+10
+ 5
0
- 5
-10
CYCLES
FROM NORMAL
20
25
30
35
40
45
50
55
60
DEGREES CENTIGRADE
A-30584


CONNECTION DETERMINED BY FREQUENCY
C10 100
C9 140
C11 100
L3
R11 27K 2W
R10 27K 2W.
R9 27K 2W.
C8 .01
R8 10K 2W.
SOLDER END OF JACK
J1 P-308-DB BACK VIEW
12BY7-A
205 V.
105 V.
7
8
5
6
4
3,9
2
-4.5
3.5V.
XX
C7 .01UF
R7 150Ω 2W.
R5 10K 2W.
FIL. X
FIL. X
METER
1
2
3
4
C12 39
5
6
R14 10Ω 1W
METER
7
8
C6 100
R6 100K 2W.
L2 2.5mh
R4 15K 2W.
R3 27K 2W.
12BY7-A
100 V.
50 V.
C5 .01UF
XX
L1 2.5mh
R2 1000Ω 2W.
-4.0
.8V
C3 24
C4 800
R1 100K 2W.
S1
C2 50
XY1
C1 50
XY2

GATES DIVISION
HARRIS-INTERTYPE CORPORATION
123 HAMPSHIRE STREET · QUINCY, ILLINOIS 62301 U.S.A

SCHEMATIC OSCILLATOR UNIT M5422

821 3816 001

TYPICAL VOLTAGE CHART

GATES BC1G, 1000/250 WATT BROADCAST TRANSMITTER

These measurements made with a Simpson #260 volt-ohmmeter, a 20,000 ohm per volt DC and 1000 ohm per volt AC instrument.

DC voltages measured to GROUND.

First Audio Input (V1, V2, 807's)

Plate Volts	275 DC	Same for both powers.
Screen Volts	200 DC	
Filament Volts	6.3 AC	
Cathode Volts	31 DC	

Cathode Follower (V3, V4, 807's)

Plate Volts	580 DC	Same for both powers.
Screen Volts	195 DC	
Cathode Volts, Neg.	70 DC	
Filament Volts	6.3 AC	

Modulators (V42, V43, 833A's)	1000 W.	250 W.
Plate Volts	2600 DC	1300 DC
Plate Current, Static	40 MA ea.	25 MA ea.
Bias Volts	65/70 DC	35 DC
Filament Volts	10 AC	10 AC

Crystal Oscillator (V1, 12BY7A)

Plate Volts	100 DC	Same for both powers.
Screen Volts	50 DC	
Cathode Volts	.8 DC	
Filaments Volts	6.3 AC	

First IPA (V2, 12BY7A, a part of Osc. Unit)

Plate Volts	205 DC	Same for both powers
Screen Volts	105 DC	
Cathode Volts	3.5 DC	
Filament Volts	6.3 AC	

Second IPA (V1, V2, Parallel 807's)

Plate Volts	625 DC	Same for both powers
Screen Volts	400 DC	
Grid Volts, Neg.	60/65 DC	
Filament Volts	6.3 AC	

TYPICAL VOLTAGE CHART

BC1G TRANSMITTER

Power Amplifier (V40, V41, 833A's)	1000 W.	250 W.
Plate Volts	2500 DC	1250 DC
Plate Current	500/550 MA	260/280 MA
Bias Volts, Neg.	360 DC	Neg. 330 DC
Filament Volts	10 AC	10 AC

Bias Supply

Output of Supply measured on
hot side of resistor, R12 ..... Neg. 280 V.) Same for both
Variable tap on resistor, R12.. Neg. 45 V.) powers.

Intermediate Plate Supply

Output of supply measured at
L46, terminal #1 .... 600/625 V. DC) Same for both powers.

High Voltage Plate Supply	1000 W.	250 W.
Output of supply measured at top end of resistor, R42	2600 DC	1300 DC

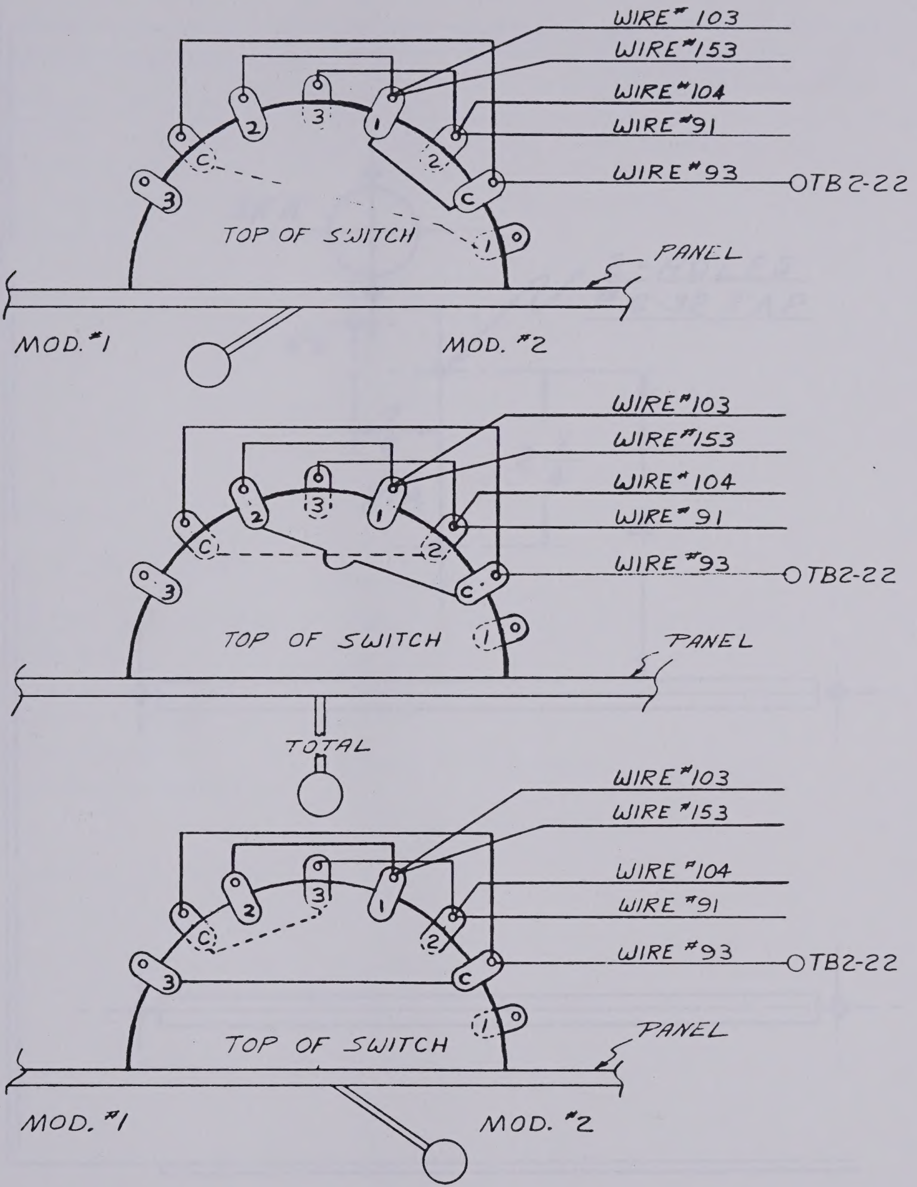
NOTE: Voltages and currents are approximate, and will vary slightly with line voltage and other local conditions.

OUTPUT LINE CUR. AMPS.	4.4																					4.4
P.A. TANK Q.	8.6	9.4	9.8	11.0	11.8	10.2	10.7	11.3	12.0	12.6	13.2	13.8	14.3	9.4	9.8	10.2	10.6	11.0	11.3	11.8	12.2	12.5
OUTPUT LOAD CAP.C45 AMPS	6.3	6.0	5.5	6.0	7.0	6.0	7.0	8.0	8.2	9.0	8.9	8.2	8.2	6.4	6.4	6.7	7.3	7.5	7.0	8.1	9.4	8.0
OUTPUT LOAD CAP. C45	.005 F3L					.004 F3L								.002 F3L								
COIL, L42 APPROX. IND. MICRO HY.	18.4	9.6	4.6	4.6	5.4	5.1	5.1	6.3	6.3	5.4	4.35	3.2	1.9	7.2	6.6	6.3	5.4	5.7	4.6	5.1	4.1	2.55
COIL, L42 No.of TURNS APPROX.	18.0	13.0	9.0	9.0	9.7	9.5	9.5	10.5	10.5	9.75	8.75	7.5	5.75	11.3	10.8	10.5	9.7	10.0	9.0	9.5	8.5	6.7
INPUT LOAD CAP.C44 AMPS	4.5	4.0	4.0	4.4	4.5	4.4	4.5	4.5	5.0	5.0	5.0	5.25	5.7	4.0	4.0	4.9	5.0	5.0	5.1	5.0	5.0	5.5
INPUT LOAD CAP. C44	.005 F3L					.004 F3L								.002 F3L								
COIL L41 APPROX. IND. MICRO HY.	10.8	10.8	4.0	4.0	4.0	4.0	4.0	4.0	2.7	2.7	2.1	1.2	.83	3.3	2.7	2.1	2.1	2.1	1.2	1.6	1.6	.83
COIL, L41 No. of TURNS APPROX.	18	18	11	11	11	11	11	11	9	9	8	6	5	10	9	8	8	8	6	7	7	5
P.A. TANK COIL, L40 IND. APPROX.	102.0	89.0	67.0	56.0	48.0	47.0	37.0	29.0	27.0	22.0	21.0	18.5	16.8	31.5	29.5	26.5	23.5	21.5	19.7	18.5	17.3	14.0
P.A. TANK COIL L40, TURNS APPROX	36.4	34.0	29.5	27.0	25.0	24.7	22.0	19.5	18.75	17.0	16.5	15.5	14.75	20.3	19.6	18.5	17.5	16.7	16.0	15.5	15.0	13.5
PA TANK CAP. C42, C43 TOTAL AMPS.	6.3	5.8	6.5	7.0	7.6	6.6	7.0	8.0	8.6	9.0	9.0	9.9	10.4	6.4	6.5	7.1	7.4	7.7	7.8	8.4	8.8	9.0
P.A. TANK CAP. C42, C43	TWO .0005 G2 IN PARALLEL					TWO .0004 G2 IN PARALLEL								TWO .00025 G2 IN PARALLEL								
SECOND IPA PAD. CAP. C13	.001 F1B		.00075 F1B		.0004 F1B		.0002 F1B							NOT USED								
SECOND IPA TUNING CAP. C4	CONDENSER C4 USED ON ALL FREQUENCIES.																					
SECOND IPA COIL, L4	TUNE COMPLETE BAND WITH COIL L4.																					
FIRST IPA TUNING CAP. C9	TUNE COMPLETE BAND WITH CAPACITOR C9. C11																					
FIRST IPA COIL, L3	SLUG ADJ. SCREW TURNED ALL IN.						SLUG ADJ. SCREW HALFWAY EXTENDED								SLUG ADJ. SCREW TURNED ALL OUT.							
FREQ.	540	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600

NOTE #1 C42 & C43 always connected in parallel, all frequencies.
NOTE #2 This chart for 50/70 ohm output impedance.
NOTE #3 These coil settings & capacitor currents are approx.
NOTE #4 Currents shown are for 1KW into Trans. dummy load.
1-29-63

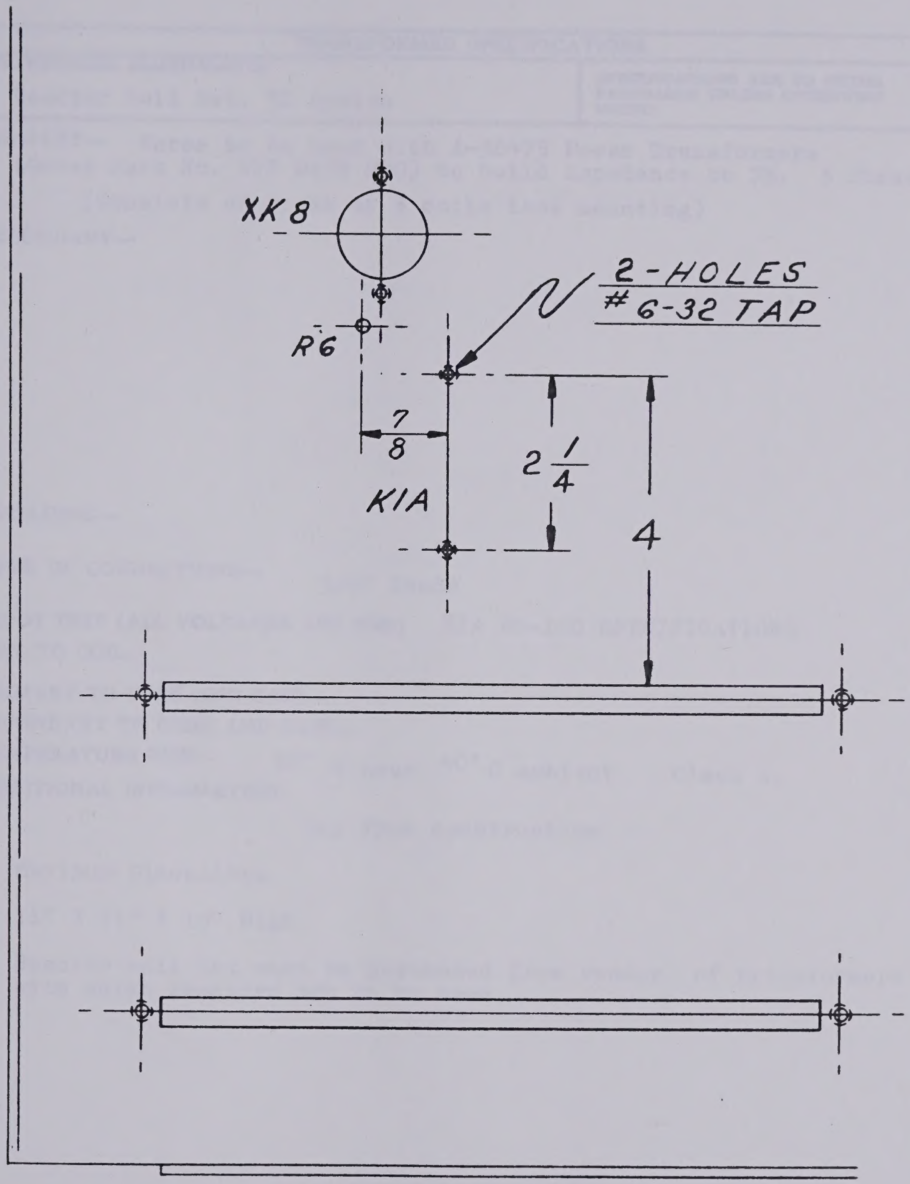
TUNING CHART
BC-1G 1000/250W.
M-6245

813 7711 001


WIRE # 103
WIRE #153
WIRE #104
WIRE #91
WIRE #93
TB2-22
C
2
3
1
TOP OF SWITCH
PANEL
MOD. #1
MOD. #2
WIRE #103
WIRE #153
WIRE # 104
WIRE # 91
WIRE #93
TB2-22
TOP OF SWITCH
PANEL
TOTAL
WIRE #103
WIRE #153
WIRE #104
WIRE #91
WIRE #93
TB2-22
TOP OF SWITCH
PANEL
MOD. #1
MOD. #2

Top Views of S1

WIRING DIAGRAM
MODULATOR SELECTOR SWITCH
813 7626 001


XK8
2-HOLES
#6-32 TAP
R6
7/8
2 1/4
4
K1A

SUPPLEMENTAL RELAY
K1A LOCATION
813 7961 001

WARNING: Disconnect primary power prior to servicing.

TRANSFORMER SPECIFICATIONS

TRANSFORMER CLASSIFICATION Reactor Coil Set, 50 cycles	SPECIFICATIONS ARE TO RETMA STANDARDS UNLESS OTHERWISE NOTED.

PRIMARY— Three to be used with A-38475 Power Transformers (Gates Part No. 472 0479 000) to build impedance to 7%. 3 Phase.

(Consists of 1 set of 3 coils less mounting)

SECONDARY—

SHIELDING—

TYPE OF CONNECTIONS— 3/8" Studs

HIPOT TEST (ALL VOLTAGES ARE RMS) EIA RS-180 SPECIFICATIONS.

COIL TO COIL—

PRIMARY TO CORE AND CASE—

SECONDARY TO CORE AND CASE—

TEMPERATURE RISE— 50° C over 40° C ambient Class A.

ADDITIONAL INFORMATION

Dry Type construction

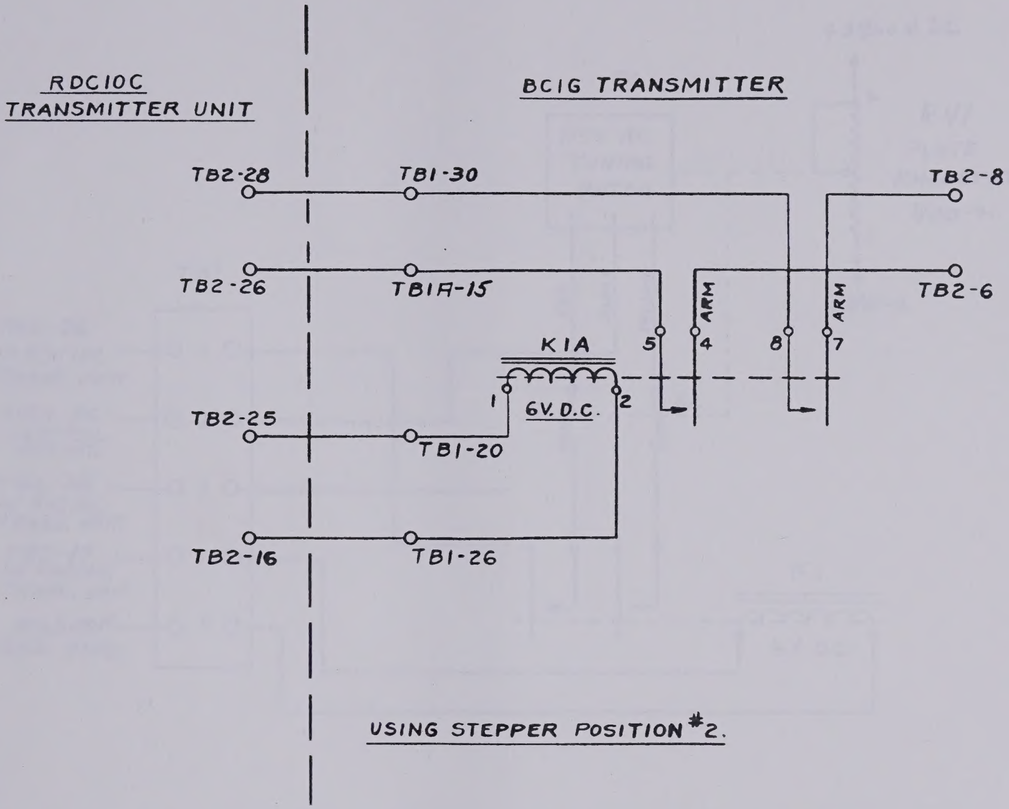
Maximum Dimensions

11" X 11" X 10" High.

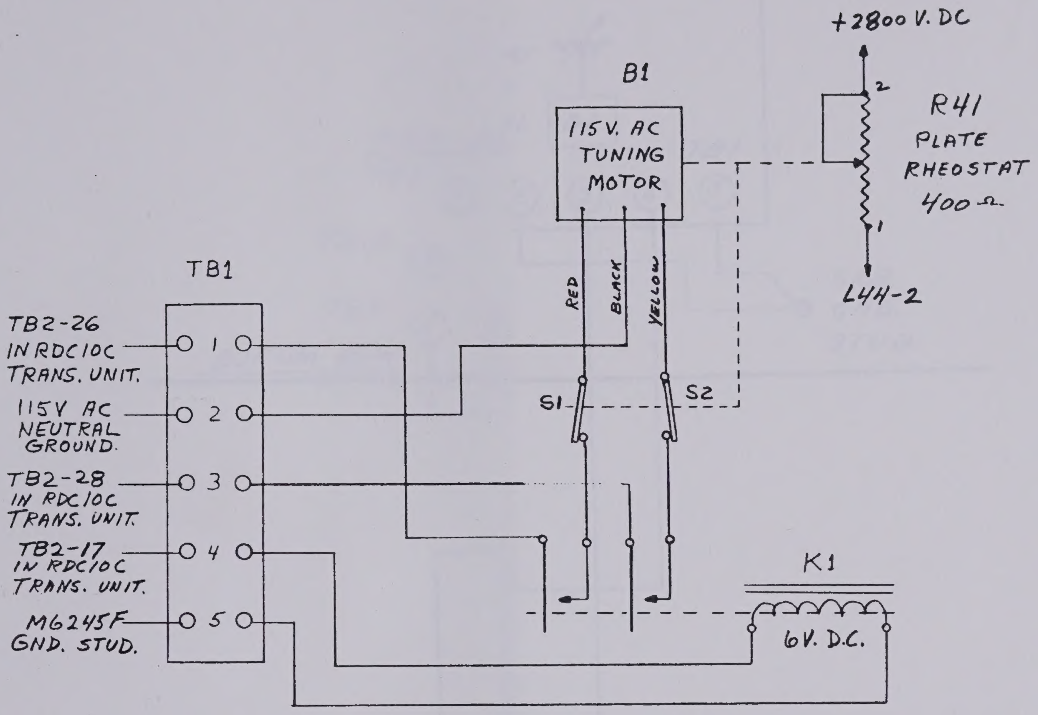
Reactor coil set must be purchased from vendor of transformers with which reactors are to be used.

STUDIO UNIT, RDC-10C
WIRING DIAGRAM
813 8485 001

WARNING: Disconnect primary power prior to servicing.


RDC10C
TRANSMITTER UNIT
BC1G TRANSMITTER
TB2-28
TB1-30
TB2-8
TB2-26
TB1A-15
TB2-6
ARM
ARM
K1A
5
4
8
7
1
2
6V. D.C.
TB2-25
TB1-20
TB2-16
TB1-26
USING STEPPER POSITION #2.

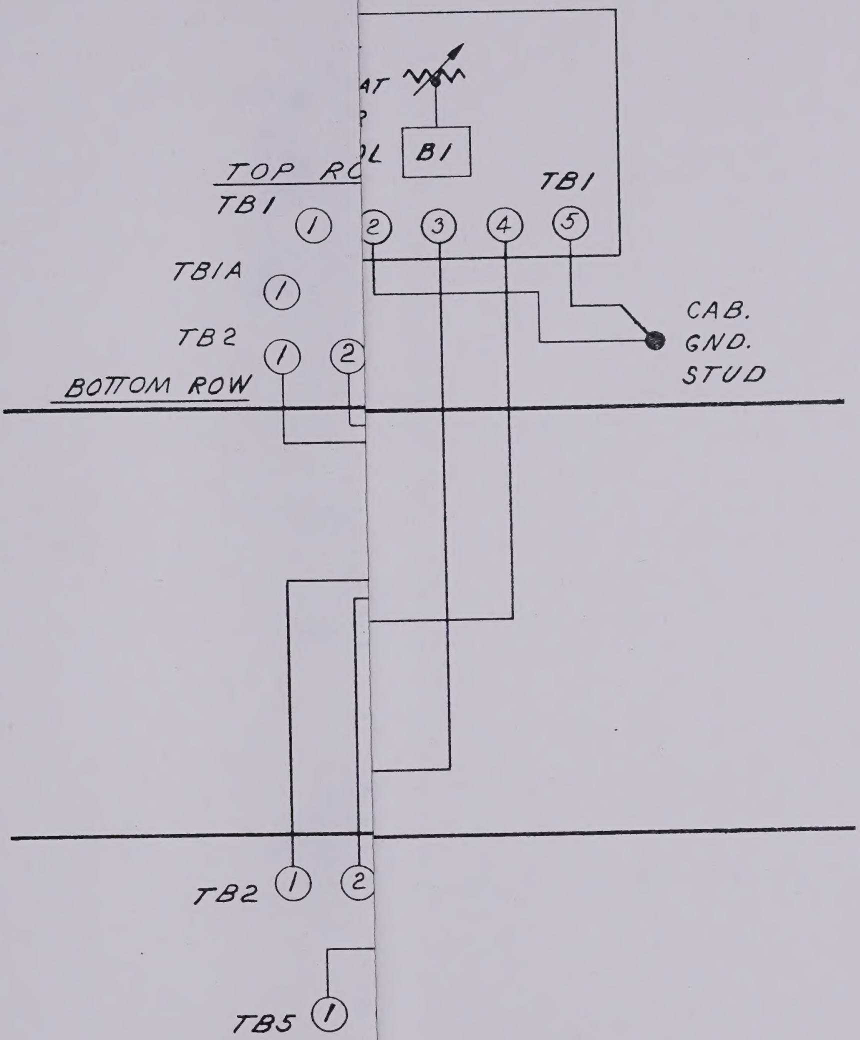
SUPPLEMENTAL RELAY CONNECTIONS
K1A
813 7928 001


+2800 V. DC
B1
115V. AC TUNING MOTOR
2
R41
PLATE RHEOSTAT
400 Ω
1
L44-2
TB1
RED
BLACK
YELLOW
TB2-26 IN RDC10C TRANS. UNIT.
115V AC NEUTRAL GROUND.
TB2-28 IN RDC10C TRANS. UNIT.
TB2-17 IN RDC10C TRANS. UNIT.
M6245F GND. STUD.
1
2
3
4
5
S1
S2
K1
6V. D.C.

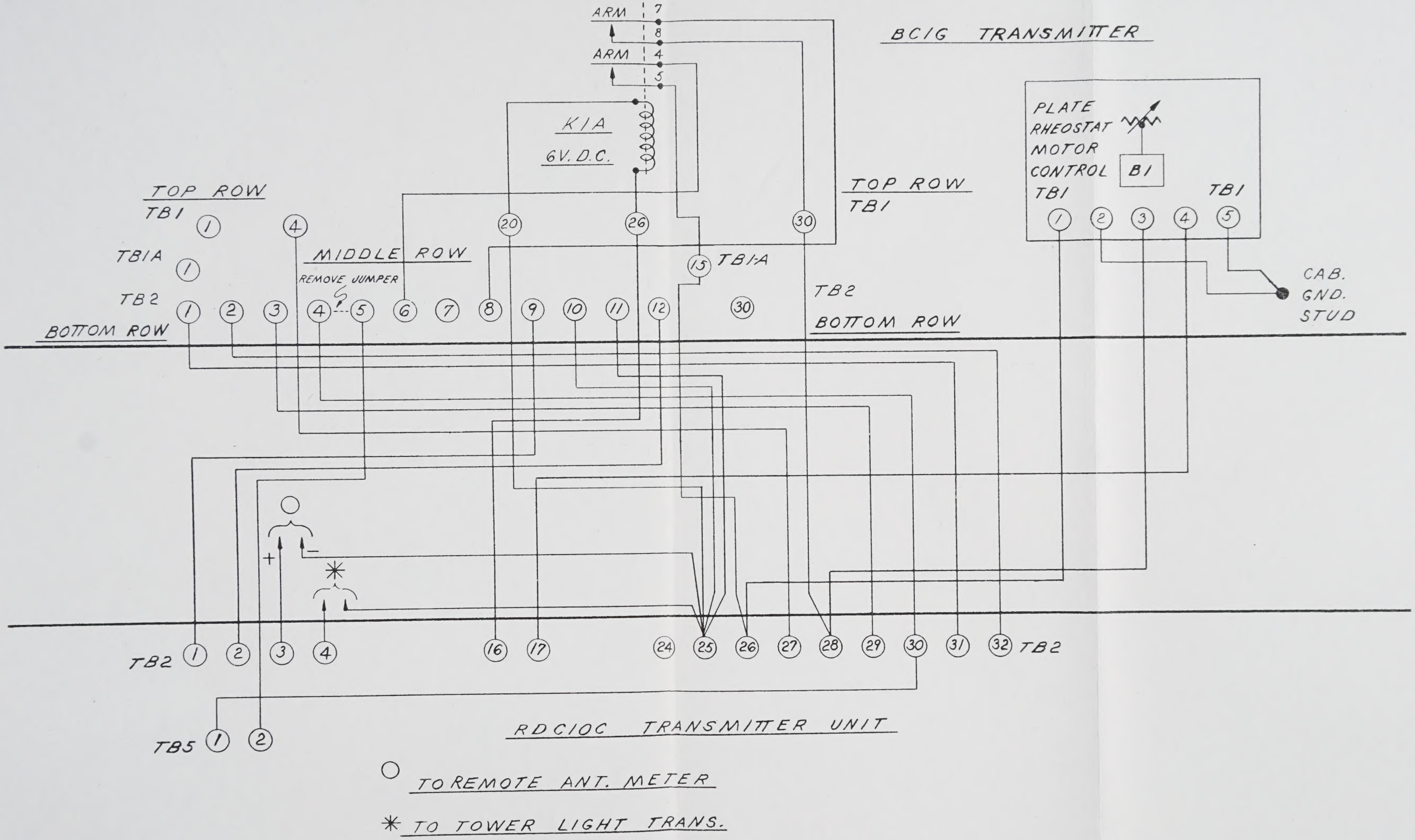
WIRING DIAGRAM
REMOTE PLATE VOLTAGE CONTROL
813 7914 001

WARNING: Disconnect primary power prior to servicing.

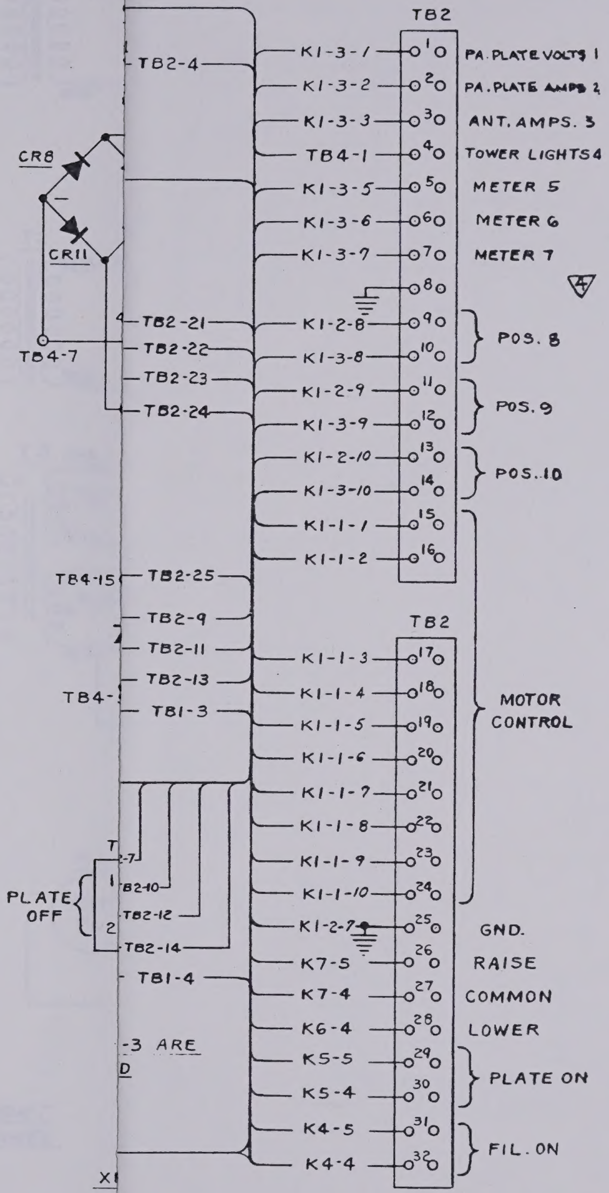
TER


AT
P
OL
B1
TOP RC
TB1
TB1
1
2
3
4
5
TB1A
1
CAB.
GND.
STUD
TB2
1
2
BOTTOM ROW
TB2
1
2
TB5
1

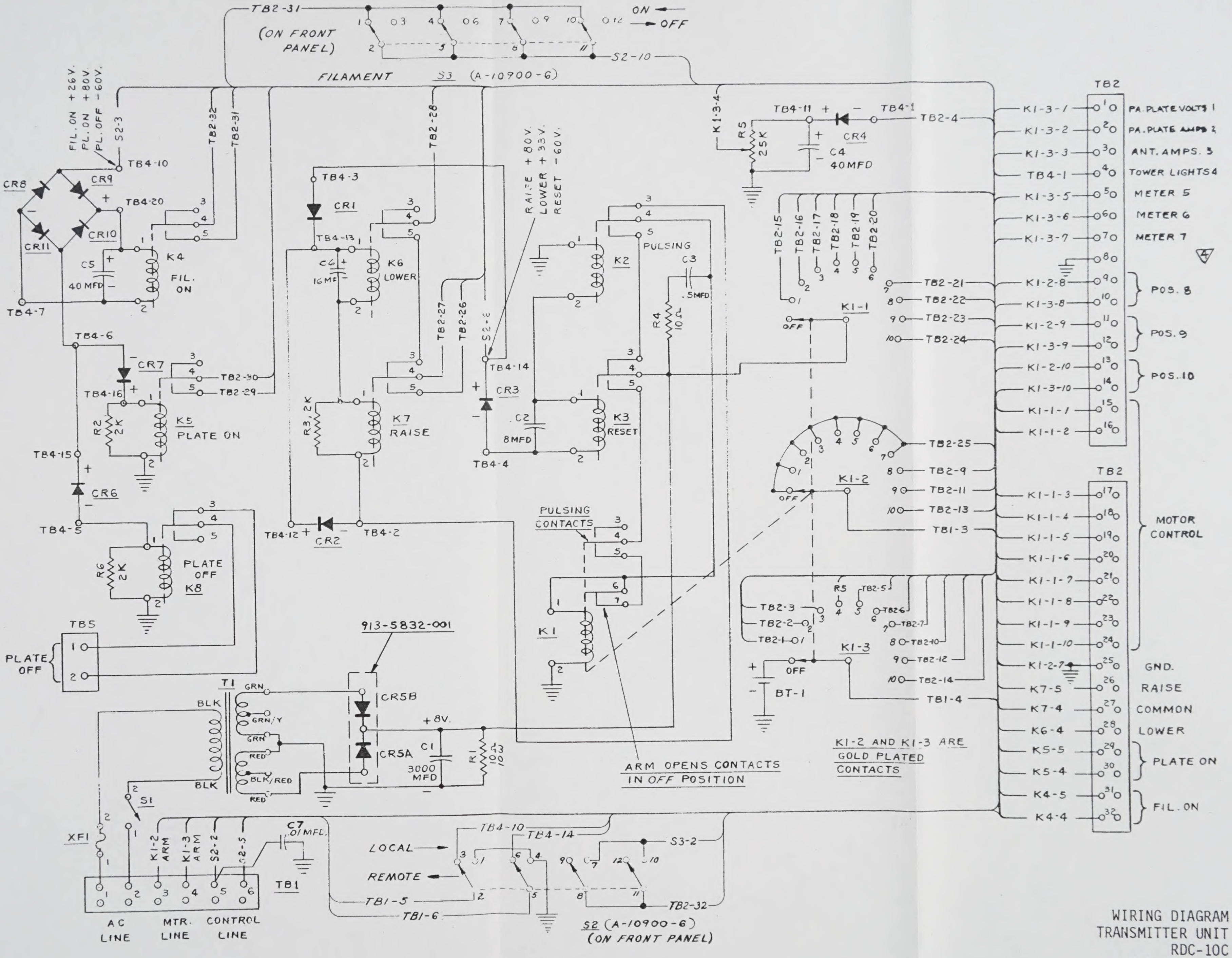
ECTIONS USING RDC-10C TRANSMITTER UNIT
826 9003 001


BC1G TRANSMITTER
ARM
7
8
ARM
4
5
K1A
6V. D.C.
TOP ROW
TB1
TB1A
TB2
BOTTOM ROW
MIDDLE ROW
REMOVE JUMPER
TB1-A
TOP ROW
TB1
TB2
BOTTOM ROW
PLATE
RHEOSTAT
MOTOR
CONTROL
TB1
B1
TB1
CAB.
GND.
STUD
+
−
TB2
TB2
TB5
RDC10C TRANSMITTER UNIT
TO REMOTE ANT. METER
✳ TO TOWER LIGHT TRANS.

INTERCONNECTIONS USING RDC-10C TRANSMITTER UNIT
826 9003 001

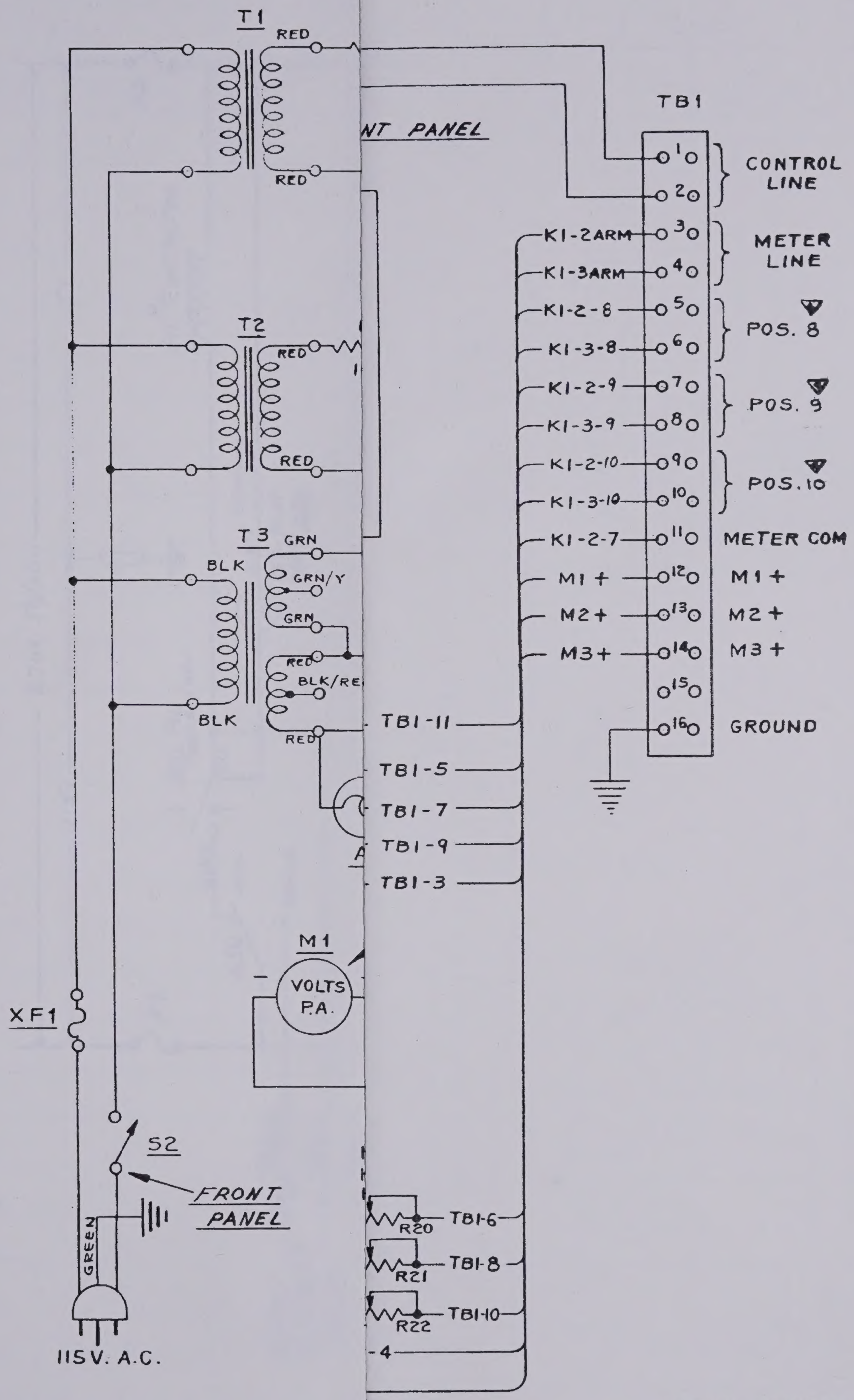

TB2
K1-3-1
K1-3-2
K1-3-3
TB4-1
K1-3-5
K1-3-6
K1-3-7
K1-2-8
K1-3-8
K1-2-9
K1-3-9
K1-2-10
K1-3-10
K1-1-1
K1-1-2
PA. PLATE VOLTS 1
PA. PLATE AMPS 2
ANT. AMPS. 3
TOWER LIGHTS 4
METER 5
METER 6
METER 7
POS. 8
POS. 9
POS. 10
TB2
K1-1-3
K1-1-4
K1-1-5
K1-1-6
K1-1-7
K1-1-8
K1-1-9
K1-1-10
K1-2-7
K7-5
K7-4
K6-4
K5-5
K5-4
K4-5
K4-4
MOTOR CONTROL
GND.
RAISE
COMMON
LOWER
PLATE ON
FIL. ON
TB2-4
CR8
CR11
TB4-7
TB2-21
TB2-22
TB2-23
TB2-24
TB4-15
TB2-25
TB2-9
TB2-11
TB2-13
TB4-
TB1-3
PLATE OFF
TB2-10
TB2-12
TB2-14
TB1-4
-3 ARE
D
X

WIRING DIAGRAM
TRANSMITTER UNIT
RDC-10C
837 9369 001

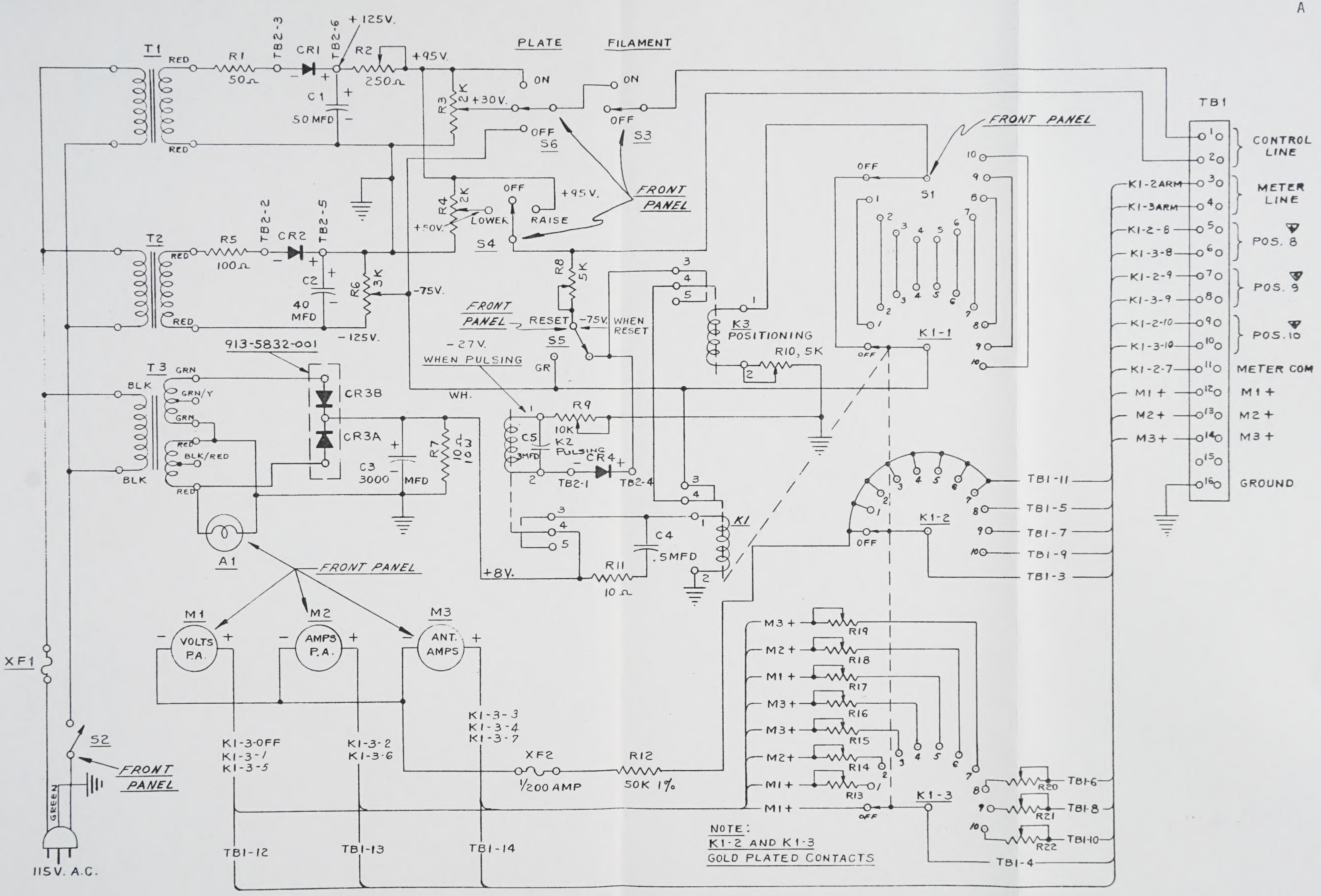

TB2-31
(ON FRONT PANEL)
ON
OFF
S2-10
FILAMENT
S3 (A-10900-6)
FIL. ON +26V.
PL. ON +80V.
PL. OFF -60V.
S2-3
TB4-10
TB4-20
TB4-7
CR8
CR9
CR10
CR11
C5 40 MFD
K4
FIL. ON
TB2-32
TB2-31
TB2-28
TB4-3
CR1
TB4-13
C6 16MF
K6 LOWER
RAISE +80V.
LOWER +33V.
RESET -60V.
TB4-6
CR7
TB4-16
TB2-30
TB2-29
R2 2K
K5 PLATE ON
TB4-15
CR6
TB4-5
R6 2K
PLATE OFF K8
TB5
PLATE OFF
R3, 2K
K7 RAISE
TB2-27
TB2-26
S2-6
TB4-14
CR3
C2 8MFD
TB4-4
K3 RESET
K2
PULSING
C3 .5MFD
R4 10Ω
TB4-12
CR2
TB4-2
913-5832-001
CR5B
CR5A
+8V.
C1 3000 MFD
R1 10Ω
T1
BLK
GRN
GRN/Y
RED
BLK/RED
S1
XF1
K1-2 ARM
K1-3 ARM
S2-2
S2-5
C7 .01 MFD.
TB1
AC LINE
MTR. LINE
CONTROL LINE
LOCAL
REMOTE
TB4-10
TB4-14
S3-2
TB1-5
TB1-6
TB2-32
S2 (A-10900-6) (ON FRONT PANEL)
PULSING CONTACTS
K1
ARM OPENS CONTACTS IN OFF POSITION
K1-3-4
R5 25K
TB4-11
TB4-1
CR4
C4 40MFD
TB2-4
TB2-15
TB2-16
TB2-17
TB2-18
TB2-19
TB2-20
TB2-21
TB2-22
TB2-23
TB2-24
K1-1
OFF
TB2-25
TB2-9
TB2-11
TB2-13
TB1-3
K1-2
TB2-3
TB2-2
TB2-1
R5
TB2-5
TB2-6
TB2-7
TB2-10
TB2-12
TB2-14
K1-3
BT-1
TB1-4
K1-2 AND K1-3 ARE GOLD PLATED CONTACTS
TB2
K1-3-1
K1-3-2
K1-3-3
TB4-1
K1-3-5
K1-3-6
K1-3-7
K1-2-8
K1-3-8
K1-2-9
K1-3-9
K1-2-10
K1-3-10
K1-1-1
K1-1-2
PA. PLATE VOLTS 1
PA. PLATE AMPS 2
ANT. AMPS. 3
TOWER LIGHTS 4
METER 5
METER 6
METER 7
POS. 8
POS. 9
POS. 10
K1-1-3
K1-1-4
K1-1-5
K1-1-6
K1-1-7
K1-1-8
K1-1-9
K1-1-10
K1-2-7
K7-5
K7-4
K6-4
K5-5
K5-4
K4-5
K4-4
MOTOR CONTROL
GND.
RAISE
COMMON
LOWER
PLATE ON
FIL. ON

WIRING DIAGRAM
TRANSMITTER UNIT
RDC-10C
837 9369 001

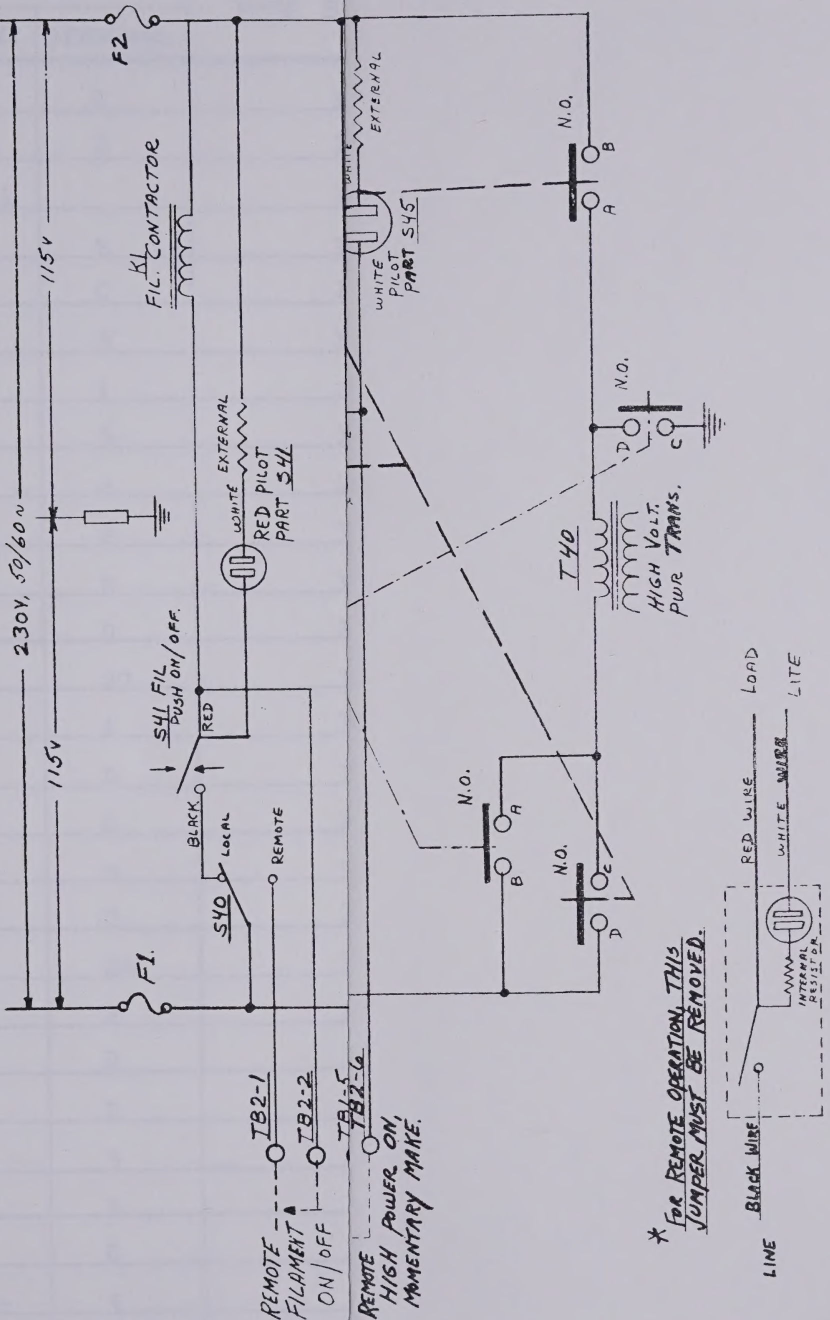
A


T1
RED
RED
NT PANEL
T2
RED
RED
T3
GRN
BLK
GRN/Y
GRN
RED
BLK/RE
BLK
RED
TB1
K1-2ARM
K1-3ARM
K1-2-8
K1-3-8
K1-2-9
K1-3-9
K1-2-10
K1-3-10
K1-2-7
M1 +
M2 +
M3 +
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
CONTROL LINE
METER LINE
POS. 8
POS. 9
POS. 10
METER COM
M1 +
M2 +
M3 +
GROUND
TB1-11
TB1-5
TB1-7
TB1-9
TB1-3
M1
VOLTS P.A.
XF1
S2
FRONT PANEL
GREEN
115V. A.C.
R20
TB1-6
R21
TB1-8
R22
TB1-10
-4

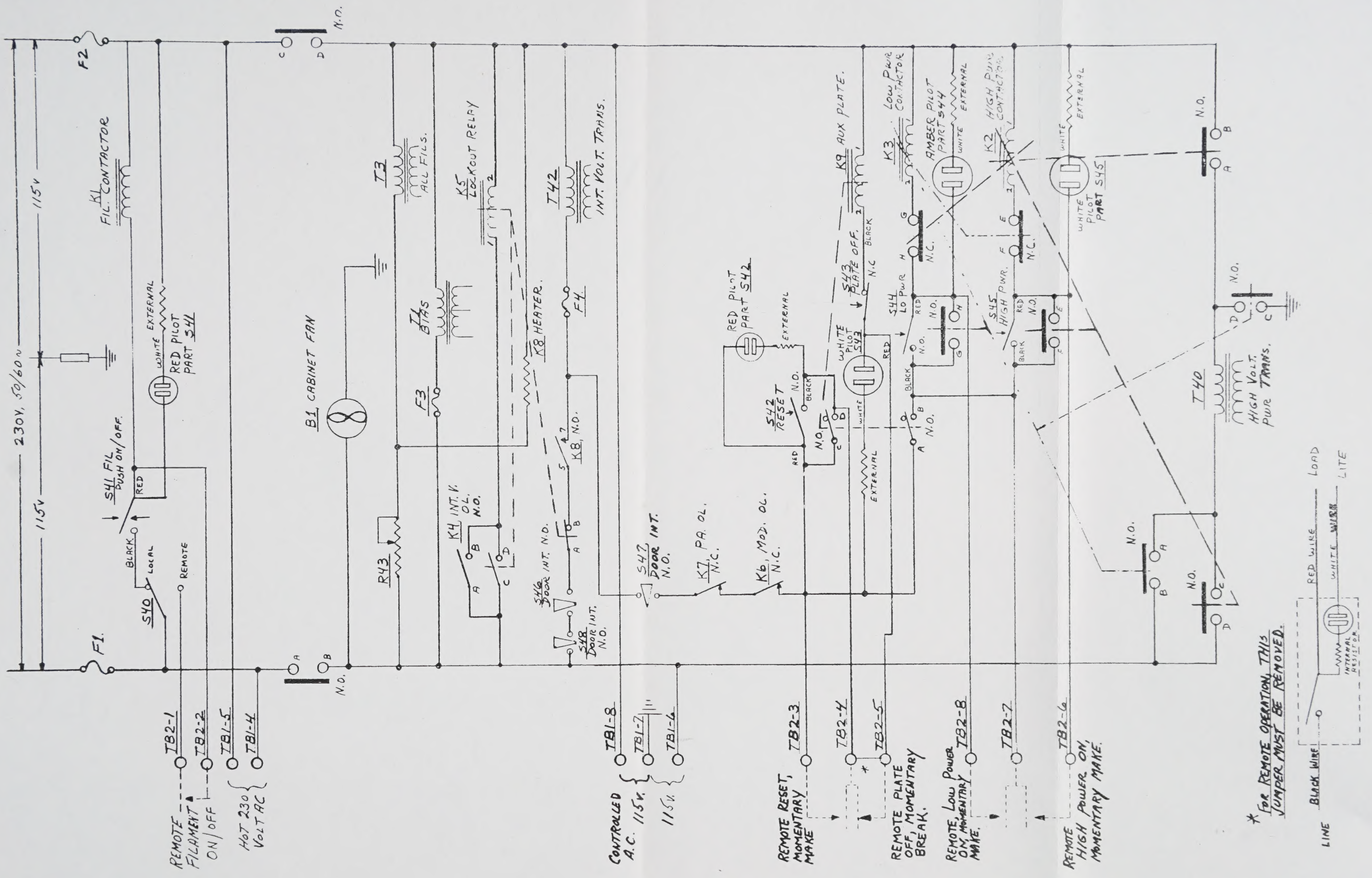
WIRING DIAGRAM
STUDIO UNIT, RDC-10C
837 8485 001


T1
RED
R1
50Ω
TB2-3
CR1
TB2-6
+125V.
R2
250Ω
+95V.
C1
50 MFD
R3
2K
+30V.
PLATE
ON
OFF
S6
FILAMENT
ON
OFF
S3
FRONT PANEL
TB1
CONTROL LINE
METER LINE
POS. 8
POS. 9
POS. 10
METER COM
M1 +
M2 +
M3 +
GROUND
K1-2ARM
K1-3ARM
K1-2-8
K1-3-8
K1-2-9
K1-3-9
K1-2-10
K1-3-10
K1-2-7
S1
K1-1
T2
R5
100Ω
TB2-2
CR2
TB2-5
C2
40 MFD
R6
3K
-75V.
-125V.
R4
2K
+50V.
LOWER
RAISE
+95V.
S4
R8
5K
RESET
-75V. WHEN RESET
S5
GR
-27V. WHEN PULSING
K3 POSITIONING
R10, 5K
913-5832-001
T3
GRN
GRN/Y
BLK
BLK/RED
CR3B
CR3A
C3
3000 MFD
R7
10Ω
WH.
R9
10K
C5
3MFD
K2 PULSING
CR4
TB2-1
TB2-4
K1
C4
.5MFD
R11
10Ω
+8V.
A1
M1
VOLTS P.A.
M2
AMPS P.A.
M3
ANT. AMPS
K1-2
TB1-11
TB1-5
TB1-7
TB1-9
TB1-3
XF1
S2
GREEN
115V. A.C.
K1-3-OFF
K1-3-1
K1-3-5
K1-3-2
K1-3-6
K1-3-3
K1-3-4
K1-3-7
XF2
1/200 AMP
R12
50K 1%
R19
R18
R17
R16
R15
R14
R13
K1-3
R20
R21
R22
TB1-6
TB1-8
TB1-10
TB1-4
TB1-12
TB1-13
TB1-14
NOTE:
K1-2 AND K1-3
GOLD PLATED CONTACTS

WIRING DIAGRAM
STUDIO UNIT, RDC-10C
837 8485 001


F2
F1.
230V, 50/60~
115V
115V
K1 FIL. CONTACTOR
S41 FIL PUSH ON/OFF.
RED
BLACK
LOCAL
REMOTE
S40
WHITE
EXTERNAL
RED PILOT PART S41
WHITE
EXTERNAL
WHITE PILOT PART S45
N.O.
A
B
N.O.
D
C
T40
HIGH VOLT. PWR TRANS.
N.O.
A
B
N.O.
C
D
TB2-1
TB2-2
TB1-5
TB2-6
REMOTE FILAMENT ON/OFF
REMOTE HIGH POWER ON, MOMENTARY MAKE.
*FOR REMOTE OPERATION, THIS JUMPER MUST BE REMOVED.
LINE
BLACK WIRE
RED WIRE
WHITE WIRE
LOAD
LITE
INTERNAL RESISTOR

CONTROL CIRCUITRY
826 8808 001


230V, 50/60N
115V
115V
F1
F2
K1 FIL. CONTACTOR
S41 FIL PUSH ON/OFF
RED PILOT PART S41
WHITE
EXTERNAL
RED
BLACK
S40
LOCAL
REMOTE
B1 CABINET FAN
N.O.
T3 ALL FILS.
T1 BIAS
F3
R43
K5 LOCKOUT RELAY
K4 INT. V. OL. N.O.
K8 HEATER
T42 INT. VOLT. TRANS.
F4
K8 N.O.
S46 DOOR INT. N.O.
S48 DOOR INT. N.O.
S47 DOOR INT. N.O.
K7 PA. OL. N.C.
K6 MOD. OL. N.C.
RED PILOT PART S42
S42 RESET
WHITE PILOT S43
S43 PLATE OFF. N.C BLACK
K9 AUX PLATE.
S44 LO PWR
K3 LOW PWR CONTACTOR
AMBER PILOT PART S44
S45 HIGH PWR.
K2 HIGH PWR CONTACTOR
WHITE PILOT PART S45
N.C.
T40 HIGH VOLT. PWR TRANS.
TB2-1
TB2-2
TB1-5
TB1-4
TB1-8
TB1-7
TB1-6
TB2-3
TB2-4
TB2-5
TB2-8
TB2-7
TB2-6
REMOTE FILAMENT ON/OFF
HOT 230 VOLT AC
CONTROLLED A.C. 115V.
115V.
REMOTE RESET, MOMENTARY MAKE
REMOTE PLATE OFF, MOMENTARY BREAK.
REMOTE, LOW POWER ON, MOMENTARY MAKE.
REMOTE HIGH POWER ON, MOMENTARY MAKE.
* FOR REMOTE OPERATION, THIS JUMPER MUST BE REMOVED.
LOAD
LITE
RED WIRE
WHITE WIRE
BLACK WIRE
LINE
INTERNAL RESISTOR

CONTROL CIRCUITRY
826 8808 001

BC1G, M6245, 1000/250 W.

DATE 10-12-62	RUNNING SHEET = PANEL & SHELF	CABLE NO. 952 5801 001

WIRE NO.	FROM		WIRE SIZE AND TYPE		TO	
	EQUIPMENT	TERMINAL			EQUIPMENT	TERMINAL
1	F1	2	12	Blk	K1	A
2	F2	2	12	Blk	K1	C
3	Neutral		12	Blk	TB1	1
4	K2	B	12	Blk	K1	D
5	K2	C	12	Blk	K3	A
6	K1	B	12	Blk	TB1	2
7	T3	1	12	Blk	TB1	3
8	T3	3	12	Blk	K1	D
9	F1	2	12	Blk	TB1	4
10	F2	2	12	Blk	TB1	5
11	K1	B	12	Blk	TB1	6
12	K1	D	12	Blk	TB1	8
13	TB2	27	12	Blk	K1	F
14	K2	A	12	Blk	K3	D
15	K3	D	12	Blk	TB1	9
16	K2	C	12	Blk	TB1	10
17	K3	C	12	Blk	TB2	26
18	K2	D	12	Blk	K3	B
19	TB2	28	12	Blk	K1	H
20	K1	B	14	Blue	TB1	11
21	K1	D	14	Blue	TB1	12
22	TB1	1	14	Blue	Gnd	Nr T1
23	Aud	5	14	Blue	Gnd	Nr T1
24	Aud	5	14	Blue	Tie Pt 3	1
25	Aud	6	14	Blue	Tie Pt 3	2
26	RF Dvr	3	14	Blue	Tie Pt 3	1
27	RF Dvr	6	14	Blue	Tie Pt 3	2
28	Tie Pt 1	2	14	Blue	Tie Pt 3	1

SHEET 1 OF 7 DWG. NO. 813 7963 001

BC1G, M6245, 1000/250 W.

DATE 10-12-62 **RUNNING SHEET** -PANEL & SHELF **CABLE NO.** 952 5801 001

WIRE NO.	FROM		WIRE SIZE AND TYPE		TO	
	EQUIPMENT	TERMINAL			EQUIPMENT	TERMINAL
29	Tie Pt 1	4	14	Blue	Tie Pt 3	2
30	Aud	12	14	Blue	Tie Pt 3	3
31	Aud	13	14	Blue	Tie Pt 3	4
32	TB1A	7	16	Brown	K9	D
33	TB1A	6	16	Brown	K9	C
34	K9	1	16	Brown	TB1	22
35	K9	1	16	Brown	K3	1
*36	K1	C	16	Brown	K1	2
37	K2	G	16	Brown	K3	2
38	K2	2	16	Brown	K3	E
39	TB1A	8	16	Brown	K2	F
40	K1	A	16	Brown	TB1	13
41	TB2	1	16	Brown	TB1	14
42	TB2	2	16	Brown	K1	1(coil)
43	TB1	15	16	Brown	K1	1(coil)
44	TB1	16	16	Brown	K1	2(coil)
45	K2	D	16	Brown	XF3	2
46	TB1	17	16	Brown	XF3	2
47	K5	A(arm)	16	Brown	TB1	19
48	K5	B(N.C.)	16	Brown	XK8	5(N.O.)
49	TB1	24	16	Brown	XK8	7
50	XK8	7(N.O.)	16	Brown	XF4	2
51	TB1	21	16	Brown	XF4	1
52	K9	D	16	Brown	TB1	27
53	TB1	23	16	Brown	K7	A
54	TB1A	5	16	Brown	TB2	24
55	K7	B(N.C.)	16	Brown	K6	A(N.C.)
56	TB2	3	16	Brown	K6	B

*Not in "Panel & Shelf" Cable,

DWG. NO. 813 7963 001

BC1G, M6245, 1000/250 W.

DATE 10-12-62	**RUNNING SHEET** - PANEL & SHELF		**CABLE NO.** 952 5801 001	

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**		**TO**	
	EQUIPMENT	**TERMINAL**			**EQUIPMENT**	**TERMINAL**
57	TB2	6	16	Brown	K2	E
58	TB2	4	16	Brown	K9	D
59	TB2	5	16	Brown	TB1	25
60	K2	1	16	Brown	K1	D
61	TB2	7	16	Brown	K2	F
62	TB2	8	16	Brown	K3	H
63	XF3	1	16	Brown	T1	3
64	TB1	12	16	Brown	T1	1
65	Sil	AC	16	Brown	T1	3
66	Sil	AC	16	Brown	T1	6
67	K5	2	16	Brown	T1	1
*68	K5	1	16	Brown	K4	B
*69	K5	C	16	Brown	K4	A
70	K5	C	16	Brown	K1	B
71	TB2	18	16	Brown	K2	B
*72	Sil.Rect.	Bias +	16	Brown	Tie Pt 5	
73	TB1	29	16	Brown	K9	2
74	TB1A	10	16	Brown	TB2	3
75	K2	B	16	Brown	TB1	22
76	TB1A	10	16	Brown	K9	A
77	TB1A	9	16	Brown	K3	F
78	K2	E	16	Brown	K3	F
79	K5	2	16	Brown	K8	2
80	R6	2	16	Brown	TB1	3
81	C12	2	16	Brown	Gnd	Nr T1
*82	TB1	17	16	Brown	TB1	18
83	Aud	14	16	Brown	R4	1
84	Tie Pt 2	1	16	Brown	R4	2

*Not in "Panel & Shelf" Cable.

BC1G, M6245, 1000/250 W.

DATE 10-12-62	RUNNING SHEET - PANEL & SHELF			CABLE NO. 952 5801 001	
WIRE NO.	FROM		WIRE SIZE AND TYPE	TO	
	EQUIPMENT	TERMINAL		EQUIPMENT	TERMINAL
85	Tie Pt 2	1	16 Brown	C1	1
86	Tie Pt 2	2	16 Brown	R5	2
87	Tie Pt 2	2	16 Brown	TB2	19
88	R1,R2	1	16 Brown	R13	1
89	TB2	20	16 Brown	K4	1
90	C1	2	16 Brown	Gnd	Nr T2
91	R33	1	16 Brown	S1	2
92	R33	2	16 Brown	TB2	21
93	S1	C's	16 Brown	TB2	22
94	RF Dvr	1	16 Brown	TB2	23
*95	L4	CT	16 Brown	R15,R16	1
96	R17,R18,R19	1	16 Brown	R15,R16	2
97	R17,R18,R19	2	16 Brown	TB2	24
98	K7	1	16 Brown	TB2	25
99	K7	2	16 Brown	R29	1
100	R29,R30	2	16 Brown	Gnd	Nr T2
101	K3	J	16 Brown	TB1A	13
102	R17,R18,R19	2	16 Brown	Tie Pt 4	1
103	S1	1(R32-1)	16 Brown	Tie Pt 4	2
104	S1	2	16 Brown	Tie Pt 4	3
105	RF Dvr	4	20 White	S2	2 Back Wafer
*106	RF Dvr	7	20 White	Tie Pt 1	5
107	RF Dvr	8	20 White	S2	3 Front Wafer
108	RF Dvr	9	20 White	R12	3(slider)
109	RF Dvr	10	20 White	S2	3 Back Wafer
110	R17,R18,R19	2	20 White	S2	1 Back Wafer
*111	T2	7	20 White	Aud	1
*112	T2	9	20 White	Aud	2

*Not in "Panel & Shelf" Cable.

BC1G, M6245, 1000/250 W.

DATE 10-12-62 | **RUNNING SHEET-** PANEL & SHELF | **CABLE NO.** 952 5801 001

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**		**TO**	
	EQUIPMENT	**TERMINAL**			**EQUIPMENT**	**TERMINAL**
*113	T2	8	20	White	Aud	3
*114	T2	10	20	White	Aud	4
115	R12	1	20	White	T1	5
116	Aud	7	20	White	C12	1
117	Aud	8	20	White	S2	5 Back Wafer
118	Aud	9	20	White	R1	3 (Arm)
119	Aud	10	20	White	R2	3 (Arm)
120	Aud	11	20	White	T1	5
121	R28	3(Arm)	20	White	TB2	9
122	R35	2	20	White	TB2	10
123	R37	2	20	White	TB2	11
124	R36	2	20	White	TB2	12
125	TB2	13, Gnd	20	White	Gnd	Nr T2
126	S2	7 Back Wafer	20	White	TB1A	1
127	S2	7 Front Wafer	20	White	TB1A	2
128	S2	4 Front Wafer	20	White	Tie Pt 1	3
129	S2	4 Back Wafer	20	White	Tie Pt 1	1
130	833A Fil. V41	1	20	White	R7	2
131	833A Fil. V41-	2	20	White	S2	6 Back Wafer
132	NOT USED.					
133	R11	2	20	White	C3	2
134	S2	1 Front Wafer	20	White	R15,R16	2
135	Tie Pt 5 CR1	Neg.	20	White	S2	6 Front Wafer
136	K2	H	16	Brown	K3	H
137	K3	H	16	Brown	TB2.	17
138	NOT USED.					
139	NOT USED.					
*140	K3	I	RG58/U		R34	Arm

*Not in "Panel & Shelf Cable.

SHEET 5 **OF** 7

DWG. NO. 813 7963 001

1 ECN 9892 PEN 6/4/65

BC1G, M6245, 1000/250 W.

DATE 10-12-62 | RUNNING SHEET - PANEL & SHELF | CABLE NO. 952 5801 001

WIRE NO.	FROM		WIRE SIZE AND TYPE	TO	
	EQUIPMENT	TERMINAL		EQUIPMENT	TERMINAL
141	R33	2	16 Brown	K6	2
142	Gnd	Nr T1	16 Brown	K6	1
143	R9	1	16 Brown	K6	1
144	R9	2	16 Brown	K6	2
145	TB2	21	16 Brown	R32	2
*146	E1(hot)		16 Brown	R29	1
147	K4	2	16 Brown	Gnd	Nr T2
148	R1,R2	2	16 Brown	R3	2
149	TB1A	11	16 Brown	TB1	28
150	K9	B	16 Brown	K3	G
151	TB1A	13	16 Brown	Gnd	Nr T2
152	R12	2	16 Brown	Gnd	Nr T1
153	R32	1	16 Brown	S1	1
154	TB2	29	16 Brown	Gnd	Nr T1
*155	F.B.Ladder	5	16 Brown	Gnd	Nr T1
*156	F.B.Ladder	4	16 Brown	Aud	3
*157	F.B.Ladder	3	16 Brown	Aud	2
158					
159	TB2	16	16 Brown	K3	G
160	TB2	15	(Shielded pair) Red	AT1	6
160	TB2	14	Black	AT1	1
161	AT1	2	Single Shield	K3	M
162	R14	2	Single Shield	K3	N
*163	AT1	3	(Shielded pair) Red	T2	6
	AT1	4	Black	T2	1
164	K3	K	16 Brown	R13	1
165	K3	L	16 Brown	R13	2
166	TB1A	12	RG58U	R34	2

* Not in "Panel & Shelf" Cable

SHEET 6 OF 7

DWG. NO. 813 7963 001

BC1G, M6245, 1000/250 W.

DATE 10-12-62	**RUNNING SHEET** - PANEL & SHELF	**CABLE NO.** 952 5801 001

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**	**TO**	
	EQUIPMENT	**TERMINAL**		**EQUIPMENT**	**TERMINAL**
167	S2	Front 5 Wafer	20 White	Gnd	Nr S2
*168	R25	2(Board)	20 White	R28	2
*169	R31	3	20 White	R36	1
*170	K7	1	16 Brown	R10	1
*171	K7	2	16 Brown	R10	2
*172	R31	2	20 White	R37	1
*173	R30	2	20 White	R31	2
*174	R29	1	20 White	R30	1
*175	R30	1	20 White	R31	1
*176	TB1A	12	Jumper	TB1A	14
*177	T2	3	#18 Buss	Gnd	Nr T2
*178	T2	3	#18 Buss	T2	4
*179	R14	1	20 White	AT1	5
*180	TB2	4	Jumper 16 Brown	TB2	5
182	C5,C6	Gnd	16 Brown	Gnd	Nr S2
*183	R7	1	20 White	CR1	Pos
*184	K1	A	12 Black	K1	E
*185	K1	C	12 Black	K1	G
*186	R28	1	20 White	C1	2
*187	R1	1	16 Brown	R2	1
*188	R1	2	16 Brown	R2	2

*Not in "Panel & Shelf" Cable.

SHEET 7 OF 7

DWG. NO. 813 7963 001

RUNNING SHEET (SILICON) BC-1G, M-6245 1000/250W.

DATE 10-11-62	**RUNNING SHEET** CABINET WIRING			**CABLE NO.** 952 5807 001	
WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**	**TO**	
	EQUIPMENT	**TERMINAL**		**EQUIPMENT**	**TERMINAL**
1	TB42	1	16 Brown	S40	1
2	TB42	2	16 Brown	TB1	15
3	TB42	4	16 Brown	TB1	16
4	TB42	5	16 Brown	TB1A	7
5	TB42	6	16 Brown	TB1A	6
6	TB42	8	16 Brown	TB1	27
7	TB42	9	16 Brown	TB1	29
8	TB42	10	16 Brown	TB1	25
9	TB42	12	16 Brown	TB1A	10
10	TB42	13	16 Brown	TB2	16
11	TB42	14	16 Brown	TB2	17
12	TB42	16	16 Brown	TB1A	11
13	TB42	17	16 Brown	TB1A	8
14	TB42	18	16 Brown	TB1A	9
15	TB42	20	16 Brown	TB2	18
16	L43	Var.Tap	Hot Lead, RG58/U	TB1A	12
16			RG58-U Shield	Shield of Coax TB1A	13
17	T42	1, PRI	16 Brown	TB1	21
18	S40	2	16 Brown	TB1	13
19	S40	3	16 Brown	TB1	14
20	M40	Pos.	20 White	TB1A	1
21	R49	2	20 White	TB1A	2
22	M41	NEG.	20 White	TB1A	5
23	M41	POS.	16 Brown	R40	1
24	M42	NEG.	16 Brown	TB2	25
25	M42	POS.	16 Brown	TB2	24
26	M43	NEG.	16 Brown	TB2	21
27	M43	POS.	16 Brown	TB2	22

RUNNING SHEET (SILICON) BC-1G, M-6245 1000/250W.

DATE 10-11-62 **RUNNING SHEET** CABINET WIRING **CABLE NO.** 952 5807 001

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**		**TO**	
	EQUIPMENT	**TERMINAL**			**EQUIPMENT**	**TERMINAL**
28	S46	1	16	Brown	TB1	19
29	S46	2	16	Brown	S48	1
30	S47	1	16	Brown	TB1	23
31	S47	2	16	Brown	TB1	24
32	TB41	1	16	Brown	TB1	11
33	TB41	2	16	Brown	Gnd.Nr.	TB41
34						
35	TB1	1	12	Black	Main Cabinet	Ground
36	TB1	7	12	Black	Main Cabinet	Ground
37	TB2	26	12	Black	Main Cabinet	Ground
38	T42	4	16	Brown	TB2	20
39	TB2	23	16	Brown	T41	9
40	TB2	19	16	Brown	T41	7
41	TB1	2	14	Blue	R43	2
42	TB1	3	14	Blue	R43	1
43	T40	4	14	Blue	Main Cabinet	Ground
*44	L46	1	16	Brown	C47	1
45	C47	1	16	Brown	T41	7
46	T42	2	16	Brown	TB1	22
*47	T42	3	16	Brown	Sil. Assy marked AC	In Cable 937 9645 001
*48	T42	5	16	Brown	"	"
*49	C47	2	12	Black	Gnd.Nr.	C47
*50	C48	2	12	Black	Gnd.Nr.	C48
*51	R42	2	12	Black	Gnd.Nr.	R42
*52	C49	2	12	Black	Gnd.Nr.	C49
53	TB2	27	14	Blue	T44	1,PRI.
54	TB2	28	14	Blue	T44	2,PRI
55	TB2	27	14	Blue	T43	1,PRI.

*Not in Main Cabinet Cable.

RUNNING SHEET (SILICON) BC-1G. M-6245 1000/250W.

DATE 10-11-62 **RUNNING SHEET** CABINET WIRING **CABLE NO.** 952 5807 001

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**	**TO**	
	EQUIPMENT	**TERMINAL**		**EQUIPMENT**	**TERMINAL**
56	TB2	28	14 Blue	T43	4,PRI.
57	TB1	18	16 Brown	S48	2
58	TB1	11	14 Blue	TB1	17
59	TB1	12	14 Blue	TB1	22
60	TB1A	8	16 Brown	TB2	16
61	TB1A	6	16 Brown	TB2	3
62	TB1	22	16 Brown	TB1	28
63					
64	NOT USED				
*65	T40	3	Red Turbo	H.V. Sil. Board	A.C.
*66	T40	5	Red Turbo	"	"
*67	H.V.Sil. Board	Marked +	Red Turbo	"	Marked +
*68	"	"	Red Turbo	L45	2
*69	L45	1	Red Turbo	C48	1
*70	L45	1	Red Turbo	R42	1
*71	C48	1	Red Turbo	T41	2
*72	T41	4	Red Turbo	C49	1
*73	L47	1	Red Turbo	T41	5
74	L47	2	Red Turbo	R41	1
75	R41	2	Red Turbo	C48	1
*76	V42	Plate	Red Turbo	Feedback	2
*77	V43	Plate	Red Turbo	Feedback	1
*78	T41	3	Red Turbo	Feedback	2
*79	T41	1	Red Turbo	Feedback	1
*80	AUD	16	Shielded Red Turbo	V42	Grid
*81	AUD	15	Shielded Red Turbo	V43	Grid
*82	R40	2	Red Turbo	T41	5
*83	L44	2	Red Turbo	T41	5

*Not in Main Cabinet Cable.

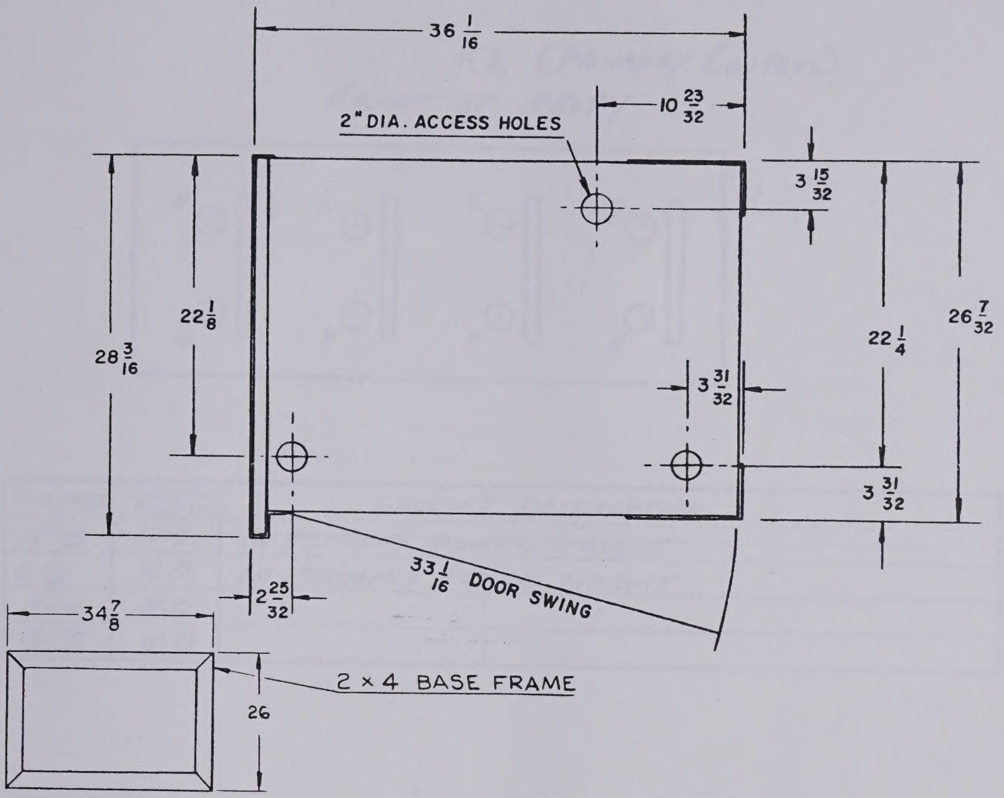
WARNING: Disconnect primary power prior to servicing.

RUNNING SHEET (SILICON) BC-1G, M-6245 1000/250W.

DATE 10-11-62 **RUNNING SHEET** CABINET WIRING **CABLE NO.** 952 5807 001

WIRE NO.	**FROM**		**WIRE SIZE AND TYPE**	**TO**	
	EQUIPMENT	**TERMINAL**		**EQUIPMENT**	**TERMINAL**
*84	Rmt Pl. Volt Res. Assy	1	Red Turbo	R40	2
*85	L46	2	16 Brown	625V Sil. Assy +	In Cable 937 9645 001
86	T40	1	12 Black	TB1	9
87	T40	2	12 Black	TB1	10
*88	V40	Fil.	Jumper 12 Black	V41	Fil.
*89	V40	Fil.	Jumper 12 Black	V41	Fil.
*90	L43	2	Jumper #14 Blue	Gnd.	

*Not in Main Cabinet Cable.

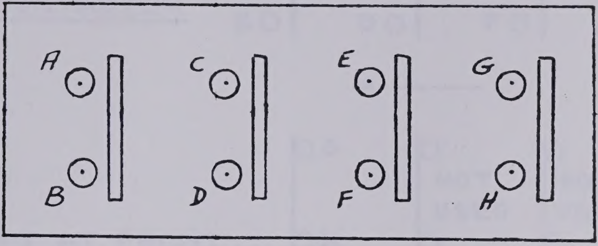

36 1/16
10 23/32
2" DIA. ACCESS HOLES
3 15/32
22 1/8
28 3/16
22 1/4
26 7/32
3 31/32
3 31/32
33 1/16 DOOR SWING
2 25/32
34 7/8
2 × 4 BASE FRAME
26

BASE LAYOUT
813 7924 001

WARNING: Disconnect primary power prior to servicing.

K1, (PRIMARY CONTROL)

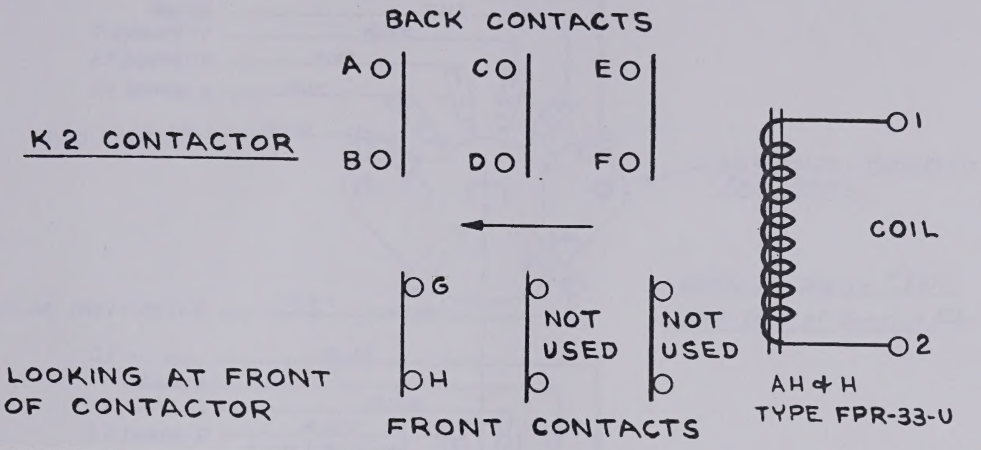
FRONT OF RELAY

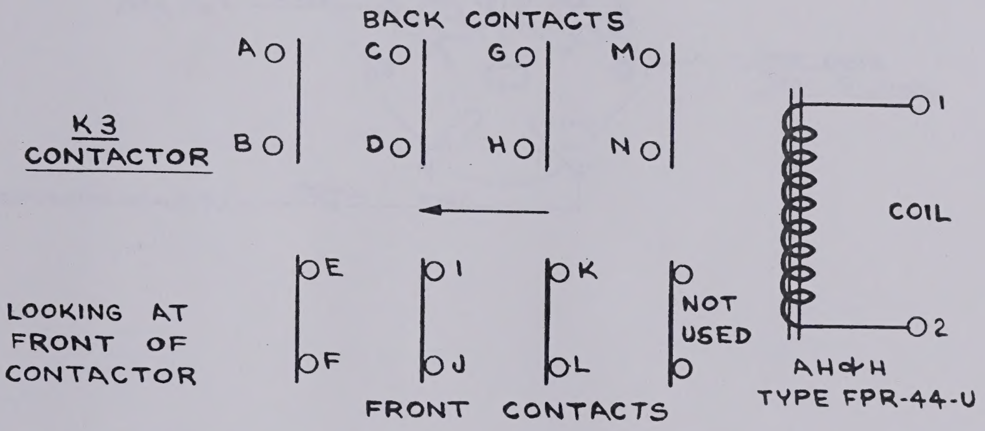


CONTACTS	NORMAL POSITION	CIRCUIT DESCRIPTION.
A-B	N.O.	IN PRIMARY POWER CIRCUIT
C-D	N.O.	IN PRIMARY POWER CIRCUIT
E-F	N.O.	
G-H	N.O	

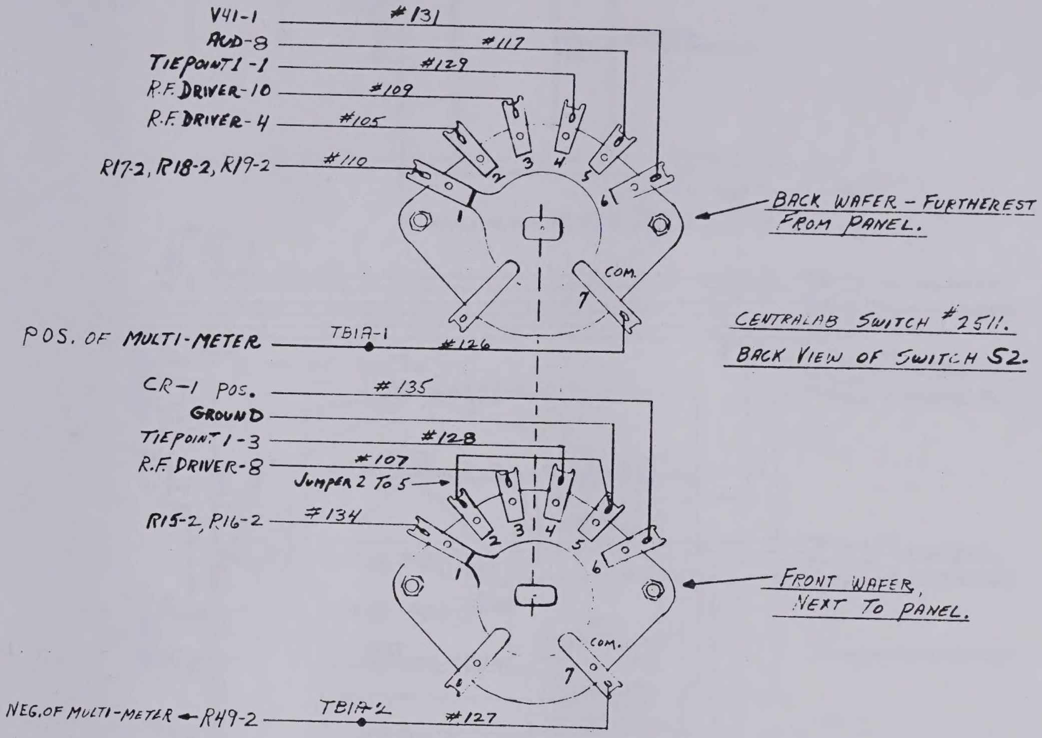
DIAGRAM
PRIMARY RELAY K1
813 7629 001

WARNING: Disconnect primary power prior to servicing.


BACK CONTACTS
A
C
E
K 2 CONTACTOR
B
D
F
1
COIL
G
NOT USED
NOT USED
2
LOOKING AT FRONT OF CONTACTOR
H
AH & H
TYPE FPR-33-U
FRONT CONTACTS


BACK CONTACTS
A
C
G
M
1
K 3 CONTACTOR
B
D
H
N
COIL
E
I
K
NOT USED
2
LOOKING AT FRONT OF CONTACTOR
F
J
L
AH & H
TYPE FPR-44-U
FRONT CONTACTS

CONTACT IDENTIFICATION
813 8885 001

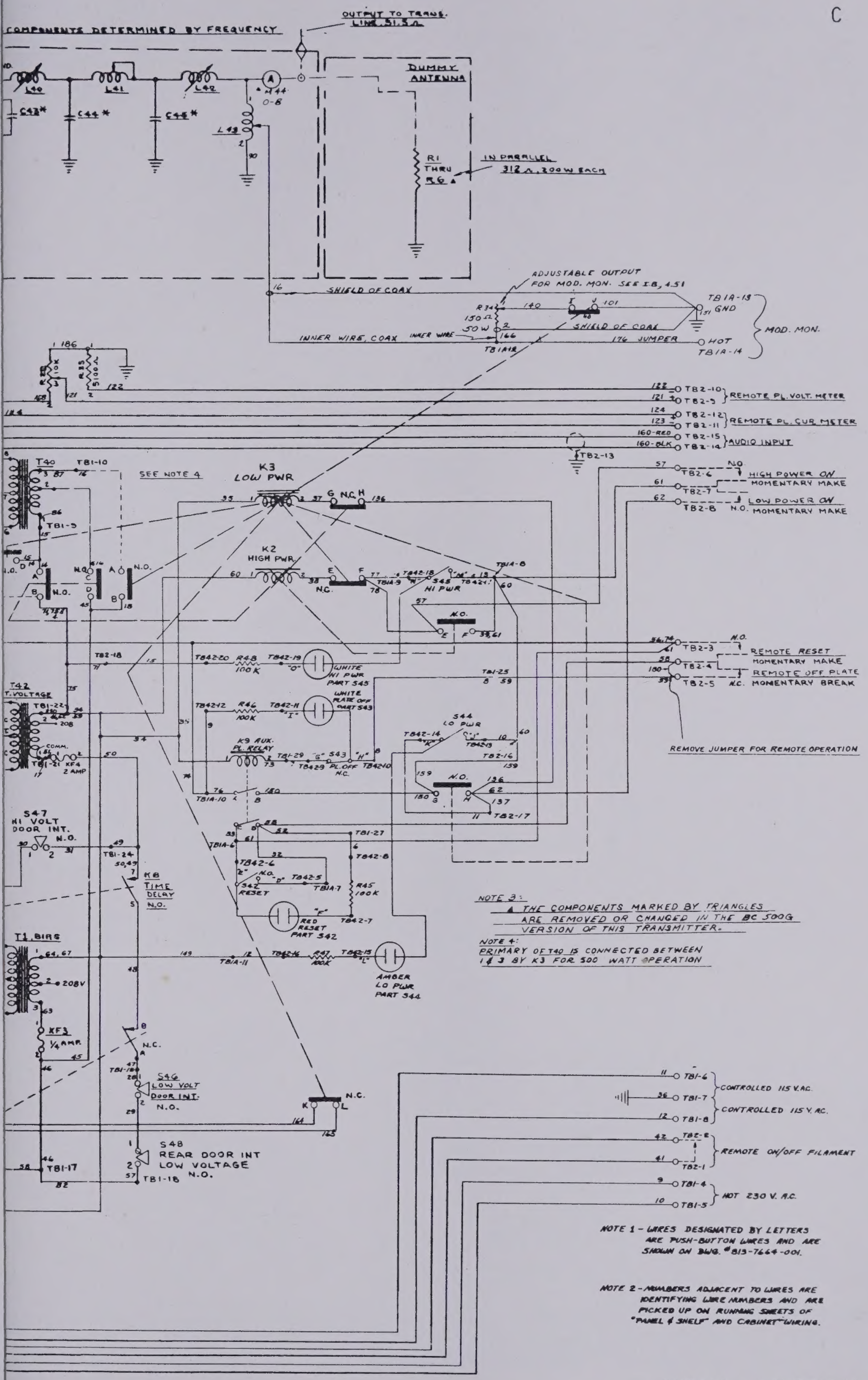

V41-1
#131
AUD-8
#117
TIEPOINT 1-1
#129
R.F. DRIVER-10
#109
R.F. DRIVER-4
#105
R17-2, R18-2, R19-2
#110
1
2
3
4
5
6
7
COM.
BACK WAFER – FURTHEREST FROM PANEL.
POS. OF MULTI-METER
TB1A-1
#126
CR-1 POS.
#135
GROUND
TIEPOINT 1-3
#128
R.F. DRIVER-8
#107
JUMPER 2 TO 5
R15-2, R16-2
#134
1
2
3
4
5
6
7
COM.
FRONT WAFER, NEXT TO PANEL.
NEG. OF MULTI-METER ← R49-2
TB1A-2
#127

CENTRALAB SWITCH #2511.

BACK VIEW OF SWITCH S2.

WIRING DIAGRAM
MULTIMETER S2 CONNECTIONS
813 7628 001

C


COMPONENTS DETERMINED BY FREQUENCY
OUTPUT TO TRANS. LINE 51.5 Ω
DUMMY ANTENNA
L40
L41
L42
C43*
C44*
C45*
M44 0-8
L43
R1 THRU R6 ▲
IN PARALLEL 312 Ω, 200W EACH
ADJUSTABLE OUTPUT FOR MOD. MON. SEE I.B. 4.51
SHIELD OF COAX
R34 150 Ω 50 W
SHIELD OF COAX
TB1A-13 GND
MOD. MON.
INNER WIRE, COAX
INNER WIRE
176 JUMPER
HOT TB1A-14
TB1A12
R35 5100 Ω
TB2-10
TB2-9
REMOTE PL. VOLT. METER
TB2-12
TB2-11
REMOTE PL. CUR. METER
160-RED
160-BLK
TB2-15
TB2-14
AUDIO INPUT
TB2-13
T40
TB1-10
TB1-9
SEE NOTE 4
K3 LOW PWR
N.C.
TB2-6
N.O.
HIGH POWER ON MOMENTARY MAKE
TB2-7
TB2-8
LOW POWER ON MOMENTARY MAKE
K2 HIGH PWR
S45 HI PWR
TB1A-8
N.O.
TB2-18
R48 100 K
WHITE HI PWR PART S45
TB2-3
REMOTE RESET MOMENTARY MAKE
TB2-4
REMOTE OFF PLATE MOMENTARY BREAK
TB2-5
T42 T.VOLTAGE
R46 100K
WHITE PLATE OFF PART S43
S44 LO PWR
K9 AUX. PL. RELAY
S43 PL. OFF N.C.
XF4 2 AMP
REMOVE JUMPER FOR REMOTE OPERATION
TB2-17
S47 HI VOLT DOOR INT. N.O.
TB1-24
TB1-27
TB42-8
K8 TIME DELAY N.O.
S42 RESET
R45 100K
RED RESET PART S42
T1, BIAS
208V
R47 100K
AMBER LO PWR PART S44
XF3 1/4 AMP
S46 LOW VOLT DOOR INT. N.O.
N.C.
S48 REAR DOOR INT LOW VOLTAGE N.O.
TB1-17
TB1-18
TB1-6
TB1-7
TB1-8
CONTROLLED 115 V.AC.
CONTROLLED 115 V. AC.
TB2-2
TB2-1
REMOTE ON/OFF FILAMENT
TB1-4
TB1-5
HOT 230 V. A.C.

NOTE 3:
▲ THE COMPONENTS MARKED BY TRIANGLES ARE REMOVED OR CHANGED IN THE BC 500G VERSION OF THIS TRANSMITTER.

NOTE 4:
PRIMARY OF T40 IS CONNECTED BETWEEN 1 & 3 BY K3 FOR 500 WATT OPERATION

NOTE 1 - WIRES DESIGNATED BY LETTERS ARE PUSH-BUTTON WIRES AND ARE SHOWN ON DWG. #813-7664-001.

NOTE 2 - NUMBERS ADJACENT TO WIRES ARE IDENTIFYING WIRE NUMBERS AND ARE PICKED UP ON RUNNING SHEETS OF "PANEL & SHELF" AND CABINET WIRING.

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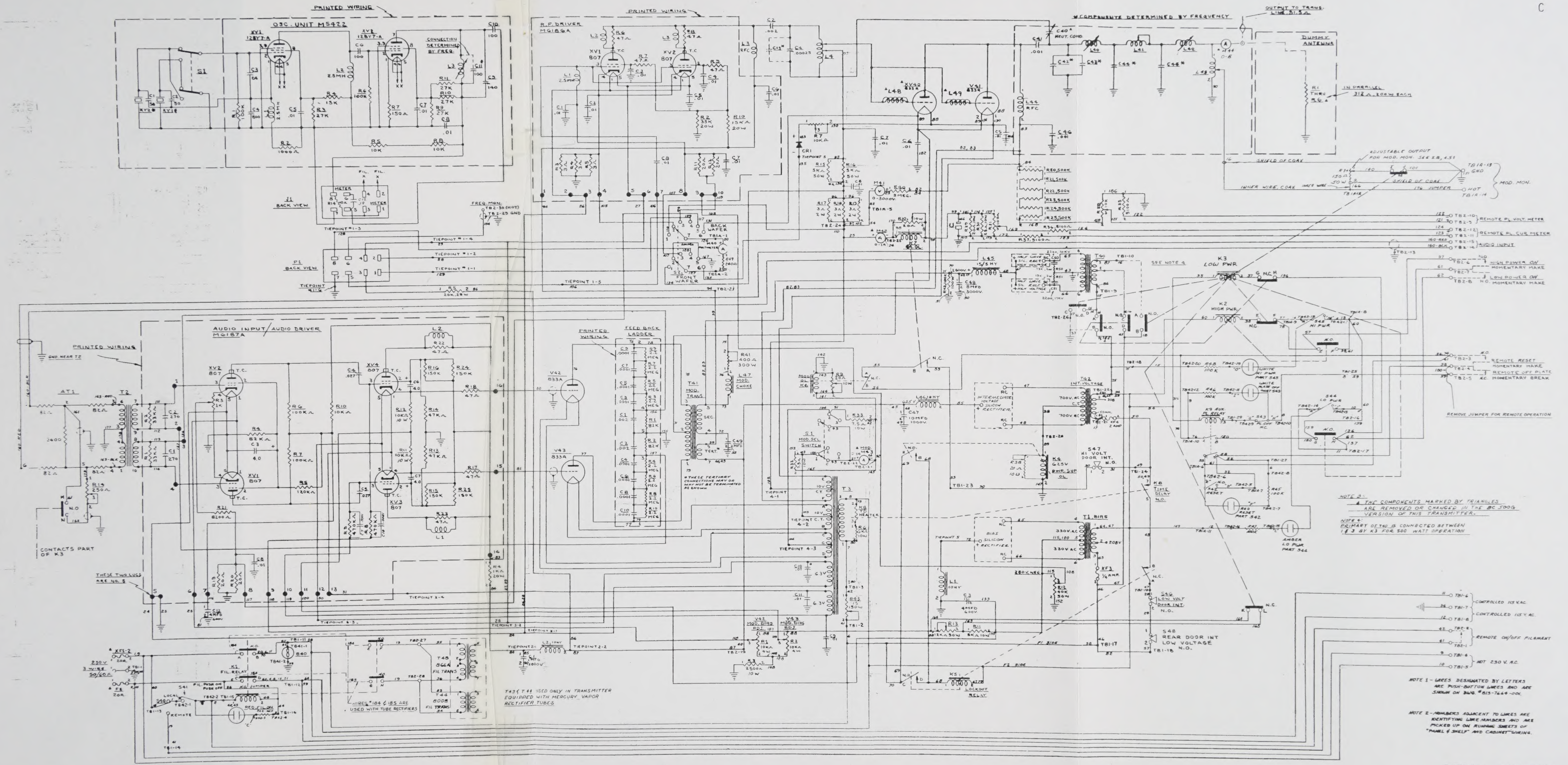
PRINTED WIRING
OSC. UNIT M5422
XV1 12BY7-A
XV2 12BY7-A
S1
XY2* XY1*
CONNECTION DETERMINED BY FREQ.
L2 2.5MH
R6 100K
R7 150Ω
R2 1000Ω
R5 10K
R8 10K
J1 BACK VIEW
METER
FIL. FIL.
P1 BACK VIEW
TIEPOINT #1-3
TIEPOINT #1-4
TIEPOINT #1-2
TIEPOINT #1-1
TIEPOINT #1-6
TIEPOINT 1-5
FREQ. MON.
TB2-30 (HOT)
TB2-29 GND
R.F. DRIVER MG186A
XV1 807
XV2 807
L3 RFC
BACK WAFER
FRONT WAFER
M40 MULTIMETER
TB1A-1
TB1A-2
TB2-23
CR1
*COMPONENTS DETERMINED BY FREQUENCY
C40* NEUT. COND.
L40
L41
L42
L43
L44 RFC
M44 0-8
OUTPUT TO TRANS. LINE 51.5Ω
DUMMY ANTENNA
R1 THRU R6
IN PARALLEL 312Ω, 200W EACH
ADJUSTABLE OUTPUT FOR MOD. MON. SEE 1.8, 4.51
SHIELD OF COAX
INNER WIRE, COAX
176 JUMPER
TB1A-13 GND
HOT TB1A-14
MOD. MON.
R20, 500K
R21, 500K
R22, 500K
R23, 500K
R24, 500K
R25, 500K
R36, 5100Ω
R37, 5100Ω
TB2-10
TB2-9
REMOTE PL. VOLT. METER
TB2-12
TB2-11
REMOTE PL. CUR. METER
TB2-15
TB2-14
AUDIO INPUT
TB2-13
TB2-6
TB2-7
HIGH POWER ON MOMENTARY MAKE
TB2-8
LOW POWER ON MOMENTARY MAKE
L45 15/5 HY
C48 8MFD 3000V.
T40
HALF WAVE SIL. RECT. HIGH VOLTAGE
SEE NOTE 4
K3 LOW PWR
K2 HIGH PWR
S45 HI PWR
TB2-3
REMOTE RESET MOMENTARY MAKE
TB2-4
REMOTE OFF PLATE
TB2-5
MOMENTARY BREAK
REMOVE JUMPER FOR REMOTE OPERATION
WHITE HI PWR PART S45
WHITE PLATE OFF PART S43
K9 AUX. PL RELAY
S44 LO PWR
RED RESET PART S42
AMBER LO PWR PART S44
R41 400Ω 300W
L47 MOD. CHOKE
T41 MOD. TRANS.
*THESE TERTIARY CONNECTIONS MAY OR MAY NOT BE TERMINATED AS SHOWN
FEED BACK LADDER
PRINTED WIRING
V42 833A
V43 833A
L46, 10 HY
C47 10MFD 1000V.
INTERMEDIATE VOLTAGE SILICON RECTIFIER
T42 INT. VOLTAGE
700V. AC
K4 625V PWR. SUP. OL
S47 HI VOLT DOOR INT. N.O.
K8 TIME DELAY N.O.
S1 MOD. SEL. SWITCH
MOD. M43
T3
TIEPOINT 4-1
TIEPOINT C.T. 4-2
TIEPOINT 4-3
HEATER
T1 BIAS
BIAS SILICON RECTIFIER
330V. AC
208V
KF3 1/4 AMP.
L1 10HY
C3 4MFD 600V.
S46 LOW VOLT DOOR INT. N.O.
S48 REAR DOOR INT LOW VOLTAGE N.O.
K5 LOCKOUT RELAY
V42 MOD. BIAS ADJ.
V43 MOD. BIAS ADJ.
R3 2500Ω 10W
TIEPOINT 2-1
TIEPOINT 2-2
L2, 10HY
C1 1MFD 1000V
TIEPOINT 3-2
TIEPOINT 3-1
T43 866A FIL TRANS
T44 8008 FIL TRANS
WIRES #184 & 185 ARE USED WITH TUBE RECTIFIERS
AUDIO INPUT/AUDIO DRIVER MG187A
XV1 807
XV2 807
XV3 807
XV4 807
AT1
T2
PRINTED WIRING
GND. NEAR T2
CONTACTS PART OF K3
THESE TWO LUGS ARE NO. 5
TIEPOINT 3-4
TIEPOINT 3-3
230V 3-WIRE 50/60~
K1 FIL. RELAY
S41 FIL PUSH ON PUSH OFF
RED FIL ON
REMOTE
TB1-6
TB1-7
TB1-8
CONTROLLED 115 V.AC.
TB2-2
TB2-1
REMOTE ON/OFF FILAMENT
TB1-4
TB1-5
HOT 230 V. A.C.

T43 & T44 USED ONLY IN TRANSMITTER EQUIPPED WITH MERCURY VAPOR RECTIFIER TUBES

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